



EAPC
ARCHITECTS ENGINEERS

HOFFMAN AUDITORIUM RENOVATION – CYRIL
MOORE HALL

500 UNIVERSITY AVE W
MINOT, ND 58707

DATE	September 4, 2026
NUMBER	20262120

SET NUMBER	
	All prints and specifications must be returned to EAPC promptly after Bid Opening.

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HOFFMAN AUDITORIUM RENOVATION – CYRIL MOORE HALL

DESIGN PROFESSIONALS OF RECORD

Architect:

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Architect under the laws of the State of North Dakota.

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Date: 9/4/2026 REG. NO. : 2162

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HOFFMAN AUDITORIUM RENOVATION – CYRIL MOORE HALL

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END OF SECTION 00 0110

SECTION 00 0200 - INVITATION TO BID

PART 1 GENERAL

1.1 PROJECT INFORMATION

- A. Project: MSU Hoffman Auditorium Remodel.
- B. Bid Date and Time: Thursday, September 24, 2026 at 2:00 PM CST
- C. Project Number: 20262120.
- D. Issue Date: September 4, 2026
- E. Issued By: EAPC Architects Engineers
 - 1. Address: 2080 36th Ave SW, Suite 210, Minot, ND 58701
 - 2. Telephone number: 701-839-4547

1.2 OUTLINE OF PROJECT

- A. The Project consists of the remodeling of an existing 2,530 SF auditorium in Cyril Moore Hall at Minot State University with new fixed seating and fixed tables, new risers, new A/V system, and wood ceiling. An alternate for a new accessible access for the front of the auditorium.

1.3 TYPE OF BIDS

- A. Separate bids will be received at the same time on the following portions of the work, separately as listed or combined at the bidders option:
 - 1. General Contract
 - 2. Mechanical Contract
 - 3. Electrical Contract
- B. Single combined bids will be received for all portions of the work. The successful bidder will be the single Prime Contractor for the Project.
- C. All of the bids will be received at the same time. The portions of work to be bid are:
 - 1. Single prime General Contract including all portions of work
 - 2. General Contract
 - 3. Mechanical Contract
 - 4. Electrical Contract

1.4 THE OWNER

- A. Minot State University
 - 1. Address: 500 University Ave W, Minot, ND 58707

1.5 BID PLACE

- A. Minot State University Westlie Room on the 3rd Floor of the Student Center

1. Address: 500 University Ave W, Minot, ND 58707

- B. Bids received after the designated time will not be accepted. All interested parties are invited to attend. Bids will be opened and publicly read aloud. It is the bidders responsibility to see that mailed or delivered bids are in the hands of the Owner prior to the time of the bid opening.

1.6 OBTAINING DOCUMENTS

- A. Drawings and Specifications may be examined at the Architect/Engineer's office, and the Owner's office at the address shown above and:
1. QuestCDN (www.questcdn.com)
 2. Dodge Plan Room and SCAN in Minneapolis.
 3. ConstructConnect
 4. Minnesota Builders Exchange in Minneapolis
 5. North Dakota Builders Exchanges: Bismarck, Fargo, Grand Forks, Minot, Williston
 6. South Dakota Builders Exchanges: Aberdeen, Plains Builders in Sioux Falls, Rapid City, Sioux Falls
 7. Montana Builders Exchange: Billings
 8. Wyoming Builders Exchange: Gillette
- B. If Contractor receives his bidding documents from a plans exchange, it is the Contractors responsibility to contact EAPC Architects Engineers to be added to the plan holders list.
- C. Complete digital project bidding documents are available at www.questcdn.com. You may download the digital plan documents for \$22.00 by inputting Quest project #10352656 on the website's Project Search page. Please contact QuestCDN.com at 952-233-1632 or info@questcdn.com for assistance in free membership registration, downloading, and working with this digital project information.
- D. An optional paper set of project documents is also available for a refundable price of \$150 per set from EAPC Architects Engineers, insert issuing office address. If the bidder returns the set of documents, in good condition, within 10 days following the bid date, the deposit will be refunded. If the bidder does not return the set of documents within the designated time, none of the deposit will be refunded. Please allow 2 days for printing.

1.7 BID SECURITY

- A. Bid Security in the amount of five (5%) percent of the Bid, including all add alternates, must accompany each Bid in accord with the Instructions to Bidders 00 1000.7. Cash, Bidders Bond, cashier's checks or certified checks will not be accepted.

1.8 NORTH DAKOTA LAW

- A. All bidders must be licensed for the highest amount of their bids, as provided by North Dakota Century Code Section 43-07-07; and no bid will be read or considered which does not fully comply with the above provisions as to bond and licenses, and any bid deficient in these respects submitted will be re-sealed and returned to the bidder immediately.

1.9 PREBID MEETING

- A. There will be a meeting of prospective bidders at 3:00 PM CST, Thursday, September 17, 2026 at Hoffman Auditorium, Cyril Moore Hall, Minot State University, 500 University Ave W, Minot, ND 58707. All those with questions for the Owner and A/E are invited to attend.

1.10 OWNER RIGHTS

- A. THE OWNER reserves the right to waive irregularities, to reject Bids and to hold all Bids for a period of 30 days after the date fixed for the opening thereof.

1.11 SIGNATURE

- A. By order of: Krista Lambrecht, Vice President Administration & Finance Minot State University.

END OF SECTION 00 0200

SECTION 00 1000 - INSTRUCTIONS TO BIDDERS

PART 1 GENERAL

1.1 INSTRUCTIONS TO BIDDERS

- A. Instructions to Bidders for Project consist of the following:
 - 1. Document 00 0200 – Invitation to Bid
 - 2. Document 00 1000 – Instructions to Bidders
 - 3. AIA Document A701-2018, "Instructions to Bidders," a copy of which is bound in this Project Manual.
 - 4. Document 00 1001 – “Supplementary Instructions to Bidders” that modify and add to the requirements of AIA Document A701-2018, Instructions to Bidders.
- B. The following sections append AIA Document A701, "Instructions to Bidders." Where a portion of the Instructions to Bidders is modified or deleted by these Instructions to Bidders, unaltered portions of the AIA Document A701 shall remain in effect.
- C. Where instructions in this Section conflict with those in Document 00 0200 - Invitation to Bid, instructions in this Document, as published or amended by Addendum, shall govern.

PART 2 PRE-BID INFORMATION

2.1 SITE EXAMINATION

- A. Examine Project Site before submitting Bid.

2.2 PREBID MEETING

- A. A prebid meeting is scheduled for 3:00 PM local time on the 17th day of September, 2026, at Hoffman Auditorium at the Cyril Moore Building on the Campus of Minot State University.
- B. Representatives of Architect/Engineer and Owner will attend.
- C. Attendance by prospective Bidders is not a mandatory prerequisite for submitting a Bid for this project.
- D. Minutes:
 - 1. Summarized minutes of this meeting will be circulated to known Bidders.
 - 2. These minutes will not form part of Contract Documents.
- E. Information relevant to Bidding Documents will be issued by Addendum. Any other discussion not included in the Addendum will not be considered official or part of the Bidding Documents.

2.3 BID SECURITY

- A. Bids shall be accompanied by Bid security as follows:
 - 1. Bid bond of a sum no less than 5 percent of the Bid Sum on AIA A310 - Bid Bond or on standard surety company form.

2.4 CONTRACT TIME

- A. Identification:
 - 1. Identify Contract Time in Bid Form.
 - 2. Completion date in Agreement shall be Contract Time added to commencement date.
- B. Perform Work within time indicated in Document 00 7000 – General Conditions.
- C. Bidder, in submitting an offer, accepts Contract Time period stated for performing Work.
- D. Time is of Essence:
 - 1. Owner requires Work of this Contract be completed as quickly as possible.
- E. Consideration will be given to time of completion when reviewing submitted Bids.

PART 3 EXECUTION (NOT USED)

END OF SECTION 00 1000



AIA® Document A701® – 2018

Instructions to Bidders

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

Hoffman Auditorium Renovation - Cyril Moore Hall
500 University Ave W
Minot, North Dakota 58707
EAPC Project# 20262120

THE OWNER:

(Name, legal status, address, and other information)

State Board of Higher Education dba Minot State University
500 University Ave W
Minot, North Dakota 58707

THE ARCHITECT:

(Name, legal status, address, and other information)

Engineers-Architects, P.C. (herein known as EAPC Architects Engineers)
2080 36th Ave SW, Suite 210
Minot, ND 58701
701.839.4547

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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,

ADDITIONS AND DELETIONS:

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

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

§ 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, to which Work may be added or deleted by 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, or that does not change, 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 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 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 observations with the requirements of the Proposed Contract Documents;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

| Email, Builders Exchanges, QuestCDN, eapc.net

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper

documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 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.

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

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

Requests can be sent by email to scott.huber@eapc.net

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall 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 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 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.

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

§ 3.3.5 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 Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

Email, Builders Exchanges, QuestCDN, eapc.net

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 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 Prior to submitting a Bid, each Bidder shall ascertain 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 or identified in the Bidding Documents.

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

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms 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” or as required by the bid form.

§ 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 neither make 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 and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name 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.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

5%

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, 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. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:

(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

As indicated in the Invitation to Bid and Bid Form.

§ 4.3.2 Paper copies of the Bid, the bid security, 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.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

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

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:

(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

The amount of the bid security shall be forfeited to the owner.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, 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 best interests.

§ 5.3.2 Unless otherwise prohibited by law, 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 lowest responsive and responsible 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 and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 Owner's Financial Capability

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

§ 6.3 Submittals

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

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; 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 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, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for 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.

§ 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 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

§ 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 commence sooner 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.

§ 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 to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

- .1** AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

See Section 00 3000 - Forms

- .2** AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

See Section 00 3000 - Forms

- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

See Section 00 3000 - Forms

- .4 Building Information Modeling Exhibit, if completed:

N/A

- .5 Drawings

GENERAL

G001 COVER SHEET
G101 LIFE SAFETY PLAN

CIVIL

C001 CIVIL LEGEND & NOTES
C201 CIVIL DETAILS
C601 EXISTING CONDITIONS & REMOVALS PLAN
C602 CIVIL SITE PLAN
C603 CIVIL GRADING PLAN

ARCHITECTURAL

A001 GENERAL ARCHITECTURAL INFORMATION
A021 WALL TYPES AND DOOR INFORMATION
A101 DEMOLITION PLAN
A201 FLOOR PLANS AND ELEVATIONS
A301 REFLECTED CEILING PLAN
A310 CEILING BASIS OF DESIGN
A320 CEILING OVERVIEW
A321 CEILING REFERENCE LEVEL 1 - GRIDS D-E
A322 CEILING REFERENCE LEVEL 1 - GRIDS C, I-J
A323 CEILING REFERENCE LEVEL 1 - GRIDS F-H
A324 CEILING REFERENCE LEVEL 2 - GRIDS A-B, F-H, N-P
A325 CEILING REFERENCE LEVEL 2 - GRIDS C, I-J
A326 CEILING REFERENCE LEVEL 2 - GRIDS D-E, K-M
A330 CEILING SCHEDULES
A421 AUDITORIUM SECTIONS
A601 DETAILS & MILLWORK SECTIONS
A901 FINISH PLAN

PLUMBING & MECHANICAL

PM01 MECHANICAL SYMBOLS & LEGEND SHEET

PLUMBING

P101 FIRST FLOOR PLUMBING DEMOLITION PLAN
P201 FIRST FLOOR PLUMBING PLAN

MECHANICAL

M101 FIRST FLOOR HYDRONICS DEMOLITION PLAN
M102 FIRST FLOOR VENTILATION DEMOLITION PLAN
M201 FIRST FLOOR HYDRONICS PLAN
M301 FIRST FLOOR VENTILATION PLAN
M302 FIRST FLOOR VENTILATION ABOVE CEILING PLAN
M401 MECHANICAL SECTIONS
M701 SEQUENCE OF OPERATIONS
M801 MECHANICAL SCHEDULES & DETAILS

ELECTRICAL

E001 ELECTRICAL SYMBOLS & ABBREVIATIONS LEGEND
E100 ELECTRICAL SITE PLAN
E101 ELECTRICAL DEMOLITION PLAN
E201 ELECTRICAL POWER PLAN
E202 ELECTRICAL SECOND FLOOR PLAN
E301 ELECTRICAL LIGHTING PLAN
E401 ELECTRICAL SYSTEMS PLANS
E501 ELECTRICAL FIRE ALARM PLAN
E801 MOTOR & EQUIPMENT SCHEDULE & RISER
E802 LIGHTING SCHEDULES & DETAILS
E803 DETAILS, SCHEDULES & RISER DIAGRAMS
E901 SCHEDULES

AUDIO VIDEO

AV001 AV NOTES
AV011 AV DETAILS - CONNECTORS
AV012 AV DETAILS - CABLE AND CONDUIT
AV013 AV DETAILS - PANELS
AV014 AV DETAILS - INSTALLATION
AV031 AV SCHEDULES
AV051 AV SINGLE LINES
AV101 AV FLOOR PLAN
AV151 AV REFLECTED CEILING PLAN
AV300 AV SECTIONS
AV521 AV PANEL DETAILS
AV571 AV RACK ELEVATIONS

- .6 Specifications

See Section 00 0110 – Table of Contents

.7 Addenda:

Number	Date	Pages
To be determined		

.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.)

☐ The Sustainability Plan:

Title	Date	Pages
-------	------	-------

☒ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Article 9	Supplementary Instructions to Bidders		
Article A.5	Supplementary Conditions to A101-2017 Exhibit A		
Article 16	Article 16- Supplementary Conditions		

.9 Other documents listed below:

(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

Bid Envelope - Instructions Reminder

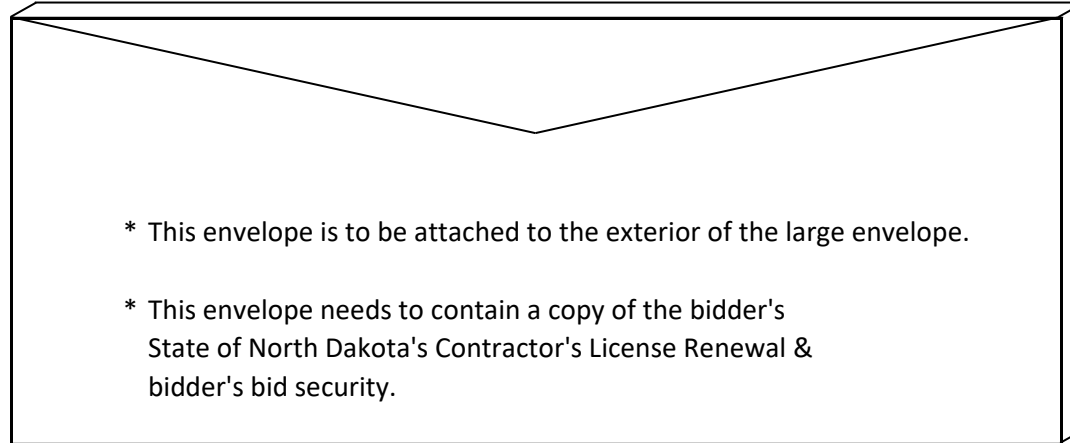
When submitting your bid, the bid envelope must contain the information indicated in the illustration below.

Contractor's Name
Address
Address

Project Name:
EAPC Project

Submitting Bid For:

Acknowledgment of Receipt of Addenda (list addendum #'s)



* This large envelope is to contain two copies of the bid form.

SECTION 00 1001 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

PART 1 ARTICLE 9. SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1.1 9.1 SUPPLEMENTS

- A. These Instructions to Bidders (AIA Document A701 - 2018, 8 Articles on 8 pages) are hereby made part of the Contract Documents. This Article 9 contains changes and additions to the AIA A701, cross referenced to the original Article numbers in AIA A701 - 2018. Where any part of AIA A701 - 2018 is not modified or voided by this Article 9 or Division 1 Specifications Sections, the unaltered part remains in effect.

1.2 ARTICLE 1 – DEFINITIONS

- A. 1.3 Change ‘Architect’ to read ‘Architect and/or Engineer.’
- B. 1.7 Add ‘...or in the proposed Contract Documents.’ to the last sentence.
- C. 1.10 Add paragraph: Local Conditions refers to the location, accessibility, general character and extent of the site, existing work or work being performed by others within or adjacent to the site, the availability of labor and utilities, and the conditions that might occur because of weather.

1.3 ARTICLE 2 – BIDDER'S REPRESENTATIONS

- A. Add to 2.1:
 - 1. .7 The Bidder has investigated all required fees, permits, and regulatory requirements of authorities having jurisdiction and has properly included in the submitted Bid the cost of such fees, permits, and requirements not otherwise indicated as provided by Owner.
 - 2. .8 The Bidder has incorporated into the Bid adequate sums for work performed by installers whose qualifications meet those indicated in the Procurement and Contracting Documents.

1.4 ARTICLE 3 – BIDDING DOCUMENTS

- A. 3.3 SUBSTITUTIONS
 - 1. Add to 3.3.1:
 - a. 3.3.1.1 The phrase "equal products by _____ may be Bid" does not relieve the Contractor of the responsibility to obtain written approval from the Architect/Engineer of the particular catalog item before purchase. A substitute product listed by Addendum as an ‘equal’ may be rejected for use in the project if subsequent information reveals it does not meet specified requirements.
 - b. 3.3.1.2 The Architect's/Engineer's approval of an item for a previous project does not constitute approval for this Project.
- B. SUBSTITUTION PROCESS

1. Add to 3.3.2.1:
 - a. Where Bidding Documents stipulate particular products, substitution requests will be considered by Architect/Engineer up to seven (7) days before receipt of Bids.
2. 3.3.2.2 Replace the text with: Requests for substitutions shall be made in writing using the Substitution Request Form as provided in Section 00 3000 – Forms, or other document with the same text. Requests for substitution shall comply with substitution request submittal requirements as specified in Section 01 6000 - Product Requirements, and include information required by Section 3.3.2.3.

1.5 ARTICLE 4 – BIDDING PROCEDURES

A. 4.1 PREPARATION OF BIDS

1. Add to 4.1.1:
 - a. 4A Bidder who wishes to give several Bids (such as both separate and combined Bids) shall use separate Bid forms for each such proposal.
 - b. 4.1.5 Replace the text with: All requested alternates shall be responded to on the Bid Form. If an alternate Bid is asked for on a type or method of construction on which a Bidder does not desire to Bid, the Bidder shall insert the words "NO BID" in the proper place. If an alternate does not involve a change in price from the base Bid, the Bidder shall insert the words "NO CHANGE" in the proper place.
Requested Alternates that are left blank on the Bid Form shall be considered as 'No Bid.'
2. Add to 4.1.6:
 - a. 4.1.6.1 A Bidder who wishes to give a single Bid, whether for one contract or a combination of contracts, shall enter the name of the contract(s) in the appropriate space on the Bid form.
3. 4.1.9 Add paragraph: Where there is a blank on the Bid form designated for major sub-bidders (such as mechanical, electrical, food service, elevator or other designated major sub-bidders) each Prime Bidder including such sub-bids shall name the sub-bidder and/or manufacturer used in his Bid
4. 4.1.10 Add paragraph: The Bid shall include unit prices when called for by the Contract Documents. The Owner may elect to consider unit prices in the determination of award. Unit prices will be incorporated into the Contract for Construction.
5. 4.1.11 Add paragraph: Bids shall include sales and use taxes as required by Law. Reimbursement of sales and use taxes, if any, shall be applied for by Owner for the sole benefit of Owner.

B. 4.2 BID SECURITY

1. 4.2.1 Replace the text with: Each Bid shall be accompanied by bid security if required by the Instructions to Bidders.
2. 4.2.3 Change text from '...AIA Document A310, Bid Bond...' to read '...AIA Document A310, Bid Bond, or on another paper document containing the same text,...'
3. 4.2.4 Delete the sentence 'However, if no Contract...bid security.'

C. 4.3 SUBMISSION OF BIDS

1. Replace 4.3.1 with the following, selecting the appropriate state:
 - a. 4.3.1 BID SUBMISSION (FOR PROJECTS LOCATED IN NORTH DAKOTA)
 - 1) All bids shall have on the outside of the sealed envelope containing the bid, the following information:

- a) Name of the person, firm or corporation submitting the bid.
 - b) Type of proposal.
 - c) Name of Project.
 - d) Return Address.
- 2) Any bid submitted without this information on the envelope will not be considered and will be returned unopened to the bidder.
- a) Only firms holding a North Dakota State Contractor's License of proper classification will be eligible to submit bids over \$500.00. Licenses are obtained through the Office of the Secretary of State, Bismarck, North Dakota. According to the requirements of the law, no license may be issued to an applicant until the expiration of ten days after filing of the application. A Contractor must be the holder of such license at least ten days prior to date set to receive bids, to become a qualified bidder, and it must be renewed for the current year. Sub-contractors shall meet the requirements of Section 43.07 of the North Dakota Century Code.
- 3) If there is North Dakota local or state tax money in the project, the bid security and a copy of the Contractor's License or Certificate of License Renewal issued by the Secretary of State (whichever is most recent) shall be in a separate envelope fastened to the envelope containing the bid. All copies of the Bid, the bid security on any other projects, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. If the Bid is sent by mail, the sealed envelope or envelopes shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED FOR _____ CONTRACT" on the face thereof. Oral, telephonic or telegraphic Bids are invalid and will not receive consideration.
- 4) Bids may be hand carried to the place of the bid opening just before the opening, or they may be delivered in advance of that time to the address under "OWNER" in the Invitation to Bid.
- 5) Each Contractor shall include in his bid the paying of all North Dakota sales taxes, use taxes, gasoline taxes, and vehicle license fees applicable to this work. Either the Contractor or his suppliers shall pay the Sales or Use Tax on materials used. See the Additional Conditions Section 00 7000-3.6.1.
- 6) The Contractor must submit for the State Tax Commissioner a certificate of income tax clearance before the Owner can enter into a contract. Before the Contractor enters into a contract with a sub-contractor, he shall obtain from him such a certificate.
- 7) Modifications of the bid by email, phone text, or telephone will not be considered.
2. 4.3.5 Replace the text with: Bids transmitted via email will be accepted only by the person designated by name, and until the date and time stated in the Invitation to Bid. Bids submitted via email shall be acceptable only if transmitted in the form and by the method designated in the Instructions To Bidders. Bidder shall be solely responsible for the timely transmission of Bid to, and confirmation of receipt by, the designated person receiving the Bids. Bids submitted orally or by any other electronic means will not be considered.
- D. 4.5 Add paragraph: BREAK-OUT PRICING BID SUPPLEMENT
- 1. Provide detailed cost breakdowns in a form acceptable to the Architect or Owner, no later than two business days following Architect's request.

- E. 4.6 Add paragraph: SUBCONTRACTORS, SUPPLIERS, AND MANUFACTURERS LIST
BID SUPPLEMENT
 - 1. Provide list of major subcontractors, suppliers, and manufacturers furnishing or installing products in a form acceptable to the Architect or Owner, no later than two business days following Architect's request. Include those subcontractors, suppliers, and manufacturers providing work totaling threepercent or more of the Bid amount. Do not change subcontractors, suppliers, and manufacturers from those submitted without approval of Architect.

1.6 ARTICLE 5 – CONSIDERATION OF BIDS

- A. 5.2 REJECTION OF BIDS
 - 1. 5.2.1 Add paragraph: Owner reserves the right to reject a Bid based on Owner's and Architect's evaluation of qualification information submitted following opening of Bids. Owner's evaluation of the Bidder's qualifications will include: status of licensure and record of compliance with licensing requirements, record of quality of completed work, record of Project completion and ability to complete, record of financial management including financial resources available to complete Project and record of timely payment of obligations, record of Project site management including compliance with requirements of authorities having jurisdiction, record of and number of current claims and disputes and the status of their resolution, and qualifications of the Bidder's proposed Project staff and proposed subcontractors.
 - 2. 5.2.2 Add paragraph: Owner may elect to disqualify a Bid due to failure to submit a Bid in the form requested, failure to Bid requested alternates or unit prices, failure to complete entries in all blanks in the Bid Form, or inclusion by the Bidder of any alternates, conditions, limitations or provisions not called for.

1.7 ARTICLE 6 – POSTBID INFORMATION

- A. 6.1 CONTRACTOR'S QUALIFICATION STATEMENT
 - 1. 6.1.1 Add paragraph: Submit Contractor's Qualification Statement no later than five business days following Architect's request.
- B. 6.3 SUBMITTALS
 - a. Add to 6.3.1:
 - 1) .4 Submit information requested in Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 no later than seven calendar days following Architect's request.

1.8 ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

- A. 7.1 BOND REQUIREMENTS
 - a. Add to 7.1.4:
 - 1) 7.1.4.1 Bond amounts shall not exceed the single bond limit for the Contractor's Bonding Company as set forth in the Federal Register current as of the bid date.
- B. 7.2 TIME OF DELIVERY AND FORM OF BONDS:

1. 7.2.1 Replace the text with: The Bidder shall deliver the required bonds to Owner no later than the date of execution of the Contract. The Owner may deem the failure of the Bidder to deliver required bonds, within the period of time allowed, a default.
2. 7.2.2 Replace the text with: Bonds shall be written on AIA Document A312 – Performance Bond and Payment Bond, the form in Section 00 3000, or on an equivalent form furnished by the Bonding Agent or Company and acceptable to the Owner.
3. 7.2.3 Replace the text with: Bonds shall be executed and be in force on the date of the execution of the Contract.
 - a. Add to 7.2.3:
 - 1) 7.2.3.1 The Bond shall remain current during the course of Construction with the Contract Sum as it remains unchanged, or as it is modified by Add-on Change Orders.

1.9 ARTICLE 8 – ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS NO
SUPPLEMENT

END OF DOCUMENT 00 1001

END OF SECTION 00 1001

SECTION 00 2000 - INFORMATION AVAILABLE TO BIDDERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes Existing Reports and Surveys.
- B. Available Project information has been furnished by Owner to Architect/Engineer for use in designing this Project.
 - 1. Each Bidder shall be fully familiar with available Project information, which has been prepared for Owner by separate consultants.
 - 2. Available Project information is offered solely for reference and shall not be considered part of Contract Documents.
 - 3. Data contained in Documents prepared by Owner's separate consultants is believed to be reliable; however, Owner and Architect/Engineer do not guarantee their accuracy or completeness.
 - 4. In preparing their Bids, Bidders shall consider and evaluate data contained in available Project information as well as Contract Documents prepared by Architect/Engineer
- C. Related Requirements:
 - 1. Document 00 1000 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.

1.3 EXISTING HAZARDOUS MATERIAL INFORMATION

- A. An existing asbestos report for Project, prepared by Badlands Environmental Consultants, Inc., dated May 20, 2026 , is available for viewing as appended to this Document.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 00 2000

May 20, 2026

Ms. Paula McCloud
Minot State University
500 University Ave. West
Minot, ND 58701

RE: P26-0127 ASBESTOS BULK SAMPLE COLLECTION & ANALYSIS
REPORT
MINOT STATE UNIVERSITY – CYRIL MOORE
AUDITORIUM
500 UNIVERSITY AVENUE WEST
MINOT, ND 58701

Dear Ms. McCloud:

Attached please find the analytical results of the eight (8) bulk samples of suspect asbestos-containing materials collected by a Badlands Environmental Consultants, Inc. (BEC) representative on April 16, 2026, from within the above referenced building, located on the campus of the Minot State University in Minot, ND (Site).

The field representative for BEC was Environmental Specialist Kayla DeHaven, who is accredited by the Environmental Protection Agency (EPA) and is certified by the North Dakota Department of Environmental Quality (NDDEQ) as an Asbestos Building Inspector.

ASBESTOS BULK SAMPLE COLLECTION & ANALYTICAL PROCEDURES

The samples of suspect ACM were collected in accordance the EPA Guidance Document, Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials (EPA 560/5.85-030a, October 1985).

The bulk samples were analyzed utilizing the Environmental Protection Agency's Method for the Determination of Asbestos in Bulk Building Materials. (EPA-600/R-93/116).

The samples were analyzed by Crisp Analytical, L.L.C. (Crisp) in Carrollton, TX. Crisp is accredited by the American Industrial Hygiene Association (AIHA) through their involvement in the National Laboratory Voluntary Accreditation Program (NVLAP) Bulk Asbestos Samples Quality Assurance Programs.

RESULTS

Results of the PLM analysis indicates that 3 of the 8 bulk samples contain 3% Chrysotile asbestos. The EPA and OSHA define an asbestos-containing material as one that contains greater than one percent asbestos (>1%).

The following material was determined to be an asbestos-containing material within the Site:

- Ceiling texture – Hoffman Auditorium (Samples 1-3).

Crisp Analytical, L.L.C.

Materials Characterization – Bulk Asbestos Analysis Report

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
Phone 972-242-2754
Fax 972-242-2798

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Overview of Project Sample Material Containing Asbestos

Customer Project:			P26-0127, Minot State University, Cyril Moore Audito CA Labs Project #: CAL26053805AG		
Laboratory Sample ID	Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
46839	1	1-1	Ceiling Texture/ white textured surfacing	3% Chrysotile	white textured surfacing
46840	2	2-1	Ceiling Texture/ white textured surfacing	3% Chrysotile	
46841	3	3-1	Ceiling Texture/ white textured surfacing	3% Chrysotile	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235
AIHA LAP, LLC Laboratory #102929

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other

pe - perlite
qu - quartz

fg - fiberglass
mw - mineral wool
wo - wollastonite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)

pa - palygorskite (clay)

This report relates to the items tested as received. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

CA Labs
Dedicated to Quality

Crisp Analytical, L.L.C.
1929 Old Denton Road
Carrollton, TX 75006
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CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

Polarized Light Asbestiform Materials Characterization

Customer Info:
Badlands Env. Consultants
1008 East Central Avenue
Bismarck, ND 58501

Attn:

Customer Project:
P26-0127, Minot State University, Cyril
Moore Auditorium
Turnaround Time:
2 days

CA Labs Project #:
CAL26053805AG

Date: 5/20/2026

Samples Rec'd: 5/18/26 10:30AM

Phone # 701-223-7335
Fax #

Date Of Sampling: 4/16/2026
Purchase Order #:

Laboratory Sample ID	Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homo-geneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
46845	7		7-1	Plaster Wall/ gray surfaced white finishing compound	n	None Detected	100% qu,bi,ca	
46845			7-2	gray plaster	y	None Detected	100% qu,ca	
46846	8		8-1	Plaster Wall/ gray surfaced white finishing compound	n	None Detected	100% qu,bi,ca	
46846			8-2	gray plaster	y	None Detected	100% qu,ca	

Dallas NVLAP Lab Code 200349-0 TEM/PLM TDSHS 30-0235

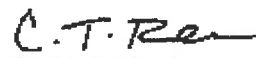
AIHA LAP, LLC Laboratory #102929

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116). All samples received in good condition unless noted.
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion staining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gy - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot - other	wo - wollastonite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:


Justin Cox
Analyst


Technical Manager
Tanner Rasmussen

Senior Analyst
Julio Robles

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze

6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

Phone: (701) 223-7335 **FAX: (701) 223-7340**

Project Identification Number: P26-0127 Minot State University - ~~Gordon B. Olson Library~~ Minot, ND 58701

Person Sampling: Kayla DeHaven

Turnaround Required: (circle one)	4 hour	24 hour	48 hour	2 day Standard	3 day

[illegible]Retinquished by


4-16-26
Date

Received By _____ 10:30 AM

Date _____

MAY 10 2002

Relinquished by

Date _____

Received By

Date _____

SECTION 00 3000 - FORMS

PART 1 GENERAL

1.1 FORMS

- A. This Section includes the following forms:

1.2 BIDDING FORMS

- A. Bid Form
- B. Bid Bond (AIA A310-2010)

1.3 FORM OF AGREEMENT & PERFORMANCE BONDS

- A. Agreement Between Owner & Contractor (AIA A101-2017)
- B. Insurance and Bonds (AIA A101-2017 Exhibit A)
- C. Supplementary Conditions to AIA A101-2017 Exhibit A
- D. Performance and Payment Bonds (AIA A312-2010)
- E. Waiver of Subrogation

1.4 ADMINISTRATIVE FORMS

- A. Application and Certificate for Payment (AIA G702-1992)
- B. Continuation Sheet (AIA G703-1992)
- C. Submittal Form
- D. Asbestos Notification of Demolition and Renovation

1.5 CLOSEOUT FORMS

- A. Non-Asbestos Certification
- B. Contractor's Affidavit of Payment of Debts and Claims (AIA G706-1994)
- C. Contractor's Affidavit of Release of Liens (AIA G706A-1994)
- D. Consent of Surety to Final Payment (AIA G707-1994)

1.6 MISCELLANEOUS FORMS

- A. Request for Information (AIA G716-2004)
- B. Substitution Request Form

C. Release Statement

PART 2 PRODUCTS (NOT APPLICABLE.)

PART 3 EXECUTION (NOT APPLICABLE.)

END OF SECTION 00 3000

BID FORM

PROJECT: MSU Hoffman Auditorium Remodel

BID OPENING DATE: Thursday, September 24, 2026

BID OPENING TIME: 2:00 PM (Local Time)

BID OPENING PLACE: MSU Westlie Room on the 3rd floor of the Student Center
500 University Ave W
Minot, ND 58707

TO THE OWNER: Minot State University
500 University Ave W
Minot, ND 58707

I have received the Drawings and Specifications for the _____ Contract for EAPC Project No. 20262120, MSU Hoffman Auditorium Remodel, to be erected at Minot, North Dakota.

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:

I will do the _____ Construction Work for the lump sum price of _____ dollars (\$_____).

ALTERNATIVES.

I will include the following alternates as specified additions to or deductions from the above Base Bid, for changes in dollars and time listed:

Alternate No. 1, New ADA Ramp

ADD \$ _____

ADD _____ Calendar Days.

Alternate No. 2, A/V 4K LED Screen

ADD \$ _____

ADD _____ Calendar Days.

Alternate No. 3, A/V Enhanced Guest Computer Access

ADD \$ _____

ADD _____ Calendar Days.

In submitting this Bid, I agree:

1. To hold my bid open for thirty (30) calendar days after its' opening.
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 Guarantee Bonds in accord with the Instructions to Bidders.
4. To accomplish the work in accord with the Contract Documents.
5. To substantially complete the Work in the Base Bid according to the following schedule:
To substantially complete the Work in the Base Bid by _____ calendar days from date of Notice to Proceed.

I have attached the required Bid Security.

I have listed below the major Subcontractors whose bids I have used in submitting this Bid:

Plumbing

Heating, Ventilating, Air Conditioning

Electrical

Official Address:	_____	Firm Name
_____	_____	signed by
_____	_____	title

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)

State Board of Higher Education dba Minot State University
500 University Ave W
Minot, North Dakota 58707

BOND AMOUNT: \$

PROJECT:

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

Hoffman Auditorium Renovation - Cyril Moore Hall
500 University Ave W
Minot, North Dakota 58707
EAPC Project# 20262120

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

ADDITIONS AND DELETIONS:

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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.

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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 ,

CONTRACTOR AS PRINCIPAL *(Signature)*

SURETY *(Signature)*

BY:

BY:

(Printed name and title)

(Printed name and title)

(Witness)

(Witness)

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)

State Board of Higher Education dba Minot State University
500 University Ave W
Minot, North Dakota 58707

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

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

Hoffman Auditorium Renovation - Cyril Moore Hall
500 University Ave W
Minot, North Dakota 58707

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

Engineers-Architects, P.C. (herein known as EAPC Architects Engineers)

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

- ☐ The date of this Agreement.
- ☐ A date set forth in a notice to proceed issued by the Owner.
- ☐ Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

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

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

§ 3.3 Substantial Completion

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§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

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

☐ By the following date:

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

Portion of Work

Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be (\$0.00), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

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

Item

Price

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

Item

Price

Conditions for Acceptance

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

Item

Price

§ 4.4 Unit prices, if any:

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

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:

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

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than () days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

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

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

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

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

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

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

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

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

§ 5.1.7.1.1 The following items are not subject to retainage:

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

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

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

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

(Insert any other conditions for release of retainage upon Substantial Completion.)

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

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

§ 5.2 Final Payment

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

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

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

§ 5.3 Interest

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

(Insert rate of interest agreed upon, if any.)

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

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

- ☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2017
- ☐ Litigation in a court of competent jurisdiction
- ☐ Other (*Specify*)

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

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

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

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

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

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

§ 8.5 Insurance and Bonds

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

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

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 Building information modeling exhibit, dated as indicated below:
(Insert the date of the building information modeling exhibit incorporated into this Agreement.)

- .5 Drawings

Number	Title	Date
--------	-------	------

- .6 Specifications

Section	Title	Date	Pages
---------	-------	------	-------

- .7 Addenda, if any:

Number	Date	Pages
--------	------	-------

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

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

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

☐ The Sustainability Plan:

Title	Date	Pages
-------	------	-------

☐ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
----------	-------	------	-------

.9 Other documents, if any, listed below:

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

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

OWNER *(Signature)*

CONTRACTOR *(Signature)*

BY: _____

BY: _____

(Printed name and title)

(Printed name and title)

AIA® Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month and year.)

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

Hoffman Auditorium Renovation - Cyril Moore Hall
500 University Ave W
Minot, North Dakota 58707

THE OWNER:
(Name, legal status and address)

State Board of Higher Education dba Minot State University
500 University Ave W
Minot, North Dakota 58707

THE CONTRACTOR:
(Name, legal status and address)

TABLE OF ARTICLES

- A.1 GENERAL**
- A.2 OWNER'S INSURANCE**
- A.3 CONTRACTOR'S INSURANCE AND BONDS**
- A.4 SPECIAL TERMS AND CONDITIONS**

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

ADDITIONS AND DELETIONS:

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.

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§ A.2.2 Liability Insurance

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

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:

(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss

Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:

(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage

Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

- ☐ **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.
- ☐ **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.
- ☐ **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.
- ☐ **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.
- ☐ **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.
- ☐ **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.
- ☐ **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

- ☐ **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

[] **§ A.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than (\$) each occurrence, (\$) general aggregate, and (\$) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than (\$) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than (\$) each accident, (\$) each employee, and (\$) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.
(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

- ☐
- § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)
- ☐
- § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for Work within fifty (50) feet of railroad property.
- ☐
- § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.
- ☐
- § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.
- ☐
- § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.
- ☐
- § A.3.3.2.6 Other Insurance
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits
----------	--------

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
AIA Document A101 – 2017 Exhibit A. Copyright © 2017. All rights reserved. "The American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This draft was produced at 12:25:55 CDT on 08/31/2026 under Subscription No.20250116178 which expires on 03/31/2027, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com. User Notes:	
(6a95b9125a564f53daf0d2b)	

Payment Bond
Performance Bond

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

DRAFT

AIA® Document A312® – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

State Board of Higher Education dba Minot State University
500 University Ave W
Minot, North Dakota 58707

ADDITIONS AND DELETIONS:

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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.

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CONSTRUCTION CONTRACT

Date:

Amount: \$ 0.00

Description:

(Name and location)

Hoffman Auditorium Renovation - Cyril Moore Hall

500 University Ave W

Minot, North Dakota 58707

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond:

None

See
Section
16

Company:

(Corporate Seal)

Company:

(Corporate Seal)

CONTRACTOR AS PRINCIPAL *(Signature)*

SURETY *(Signature)*

BY:

(Printed name and title)

BY:

*(Printed 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

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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.)

Company:

(Corporate Seal)

Company:

(Corporate Seal)

CONTRACTOR AS PRINCIPAL *(Signature)*

SURETY *(Signature)*

BY:

BY:

(Printed name and title)

(Printed name and title)

AIA® Document A312® – 2010

Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

State Board of Higher Education dba Minot State University
500 University Ave W
Minot, North Dakota 58707

ADDITIONS AND DELETIONS:

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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.

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CONSTRUCTION CONTRACT

Date:

Amount: \$ 0.00

Description:

(Name and location)

Hoffman Auditorium Renovation - Cyril Moore Hall

500 University Ave W

Minot, North Dakota 58707

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond:

None

See Section 18

Company:

(Corporate Seal)

Company:

(Corporate Seal)

CONTRACTOR AS PRINCIPAL *(Signature)***SURETY** *(Signature)*

BY:

(Printed name and title)

BY:

*(Printed 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,

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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.)

Company:

(Corporate Seal)

Company:

(Corporate Seal)

CONTRACTOR AS PRINCIPAL *(Signature)*

SURETY *(Signature)*

BY:

(Printed name and title)

BY:

(Printed name and title)

ACKNOWLEDGEMENT OF PRINCIPAL OF CONTRACTOR
(Corporation)

STATE OF _____

ss

COUNTY OF _____

On this _____ day of _____, 20____, before me personally appeared _____, known to me to be the president (or other office or person) of the corporation that is described in and that executed the within instrument, and acknowledged to me that such corporation executed the same.

(SEAL)

1 _____
Notary Public

ACKNOWLEDGEMENT OF PRINCIPAL OF CONTRACTOR
(Individual or Partnership)

STATE OF _____

ss

COUNTY OF _____

On this _____ day of _____, 20____, before me personally appeared _____, known to me to be the person (or persons) who is (are) described in and who executed the within instrument, and acknowledged to me that he (or they) executed the same.

(SEAL)

1 _____
Notary Public

ACKNOWLEDGEMENT OF ATTORNEY-IN-FACT OF SURETY

STATE OF _____

ss

COUNTY OF _____

On this _____ day of _____, 20____, before me personally appeared _____, known to me to be the person who is described in and whose name is subscribed to the within instrument as the Attorney-in-Fact of _____ and acknowledged to me that subscribed the name of _____ thereto as surety and his own name as Attorney-in-Fact.

(SEAL)

1 _____
Notary Public

NOTE: 1. The name of the notary must be legibly printed, stamped or typed immediately following his signature and the date of expiration of his commission must be endorsed thereon separately from his seal.
2. Attach copy of Power of Attorney to each Bond.

WAIVER OF SUBROGATION AND SEVERABILITY OF INTERESTS ENDORSEMENT

A certificate of liability insurance has been provided to the Owner, by the undersigned insurer on behalf of the Contractor: _____

for the following project: _____

The endorsement is provided to certify that, with respect to the insurance coverages listed on the certificate, the undersigned insured hereby waives all rights to subrogation against the Owner, it's agencies, officers, Architects and Engineers, and other employees under the insurance policies as so indicated on the certificate.

Further, where the Owner is included as an additional insured, the policies as stated on the certificate of insurance shall include a cross liability or severability of interests clause in addition to the waiver of subrogation.

The undersigned also certifies that they are authorized to make this endorsement on behalf of said insurer.

Insurer

Date

AIA® Document G702® – 1992

Application and Certificate for Payment

TO OWNER: State Board of Higher Education dba Minot State University
500 University Ave W
Minot, ND 58707

PROJECT: Hoffman Auditorium Renovation - Cyril Moore Hall
500 University Ave W
Minot, ND 58707

APPLICATION NO:

Distribution to: OWNER: [X]
ARCHITECT: [X]
CONTRACTOR: [X]
FIELD: []
OTHER: []

FROM

VIA Engineers-Architects, P.C. (herein known as EAPC Architects Engineers)
2080 36th Ave SW Suite 210
Minot, ND 58701

CONTRACTOR:

ARCHITECT:

PERIOD TO:

CONTRACT FOR:

CONTRACT DATE:

PROJECT NOS: / /

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract. AIA Document G703®, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM..... \$0.00

2. NET CHANGE BY CHANGE ORDERS..... \$0.00

3. CONTRACT SUM TO DATE (Line 1 ± 2)..... \$0.00

4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)..... \$0.00

5. RETAINAGE:

a. 0.00% of Completed Work
(Column D + E on G703: \$0.00)= \$0.00

b. 0.00% of Stored Material
(Column F on G703: \$0.00)= \$0.00

Total Retainage (Lines 5a + 5b or Total in Column I of G703)..... \$0.00

6. TOTAL EARNED LESS RETAINAGE..... \$0.00
(Line 4 Less Line 5 Total)

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT..... \$0.00
(Line 6 from prior Certificate)

8. CURRENT PAYMENT DUE..... \$0.00

9. BALANCE TO FINISH, INCLUDING RETAINAGE
(Line 3 less Line 6) \$0.00

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$0.00	\$0.00
Total approved this Month	\$0.00	\$0.00
TOTALS	\$0.00	\$0.00
NET CHANGES by Change Order		\$0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By:

Date:

State of:

County of:

Subscribed and sworn to before
me this day of

Notary Public:

My Commission
expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED..... \$0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By:

Date:

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

 AIA® Document G703® – 1992

Continuation Sheet

AIA Document G702[®], Application and Certification for Payment, or G732[™], Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.

Use Column I on Contracts where variable retainage for line items may apply.

Hoffman Auditorium
Renovation - Cyril Moore
Hall
500 University Ave W
Minot, ND 58707

APPLICATION NO:

APPLICATION DATE:

PERIOD TO:

ARCHITECT'S PROJECT NO:

08-31-2026

September 24, 2026

[illegible]



SUBMITTAL TRANSMITTAL

Project Name		Date	
Project Number		Previous Submittal Date	

To		From	
Attn			

Incomplete submittals will be returned "Not Accepted".
For each submittal, include a minimum of 1 copy and complete the following information:

SHOP DRAWINGS	No. of Copies _____	☐ Partial	☐ Complete	☐ Preliminary	☐ Final
Spec Section					
Item Description					
Manufacturer					
Supplier's Name				Phone Number	
Deviations					

PRODUCT DATA	No. of Copies _____	☐ Partial	☐ Complete	☐ Preliminary	☐ Final
Spec Section					
Item Description					
Manufacturer					
Supplier's Name				Phone Number	
Deviations					

SAMPLES	No. of Copies _____	☐ Partial	☐ Complete	☐ Preliminary	☐ Final
Spec Section					
Item Description					
Manufacturer					
Supplier's Name				Phone Number	
Deviations					

Please review the following attached submittal(s) as required by the Contract Documents.

Submitted By: _____

Phone Number: _____ Email: _____

Signature: _____

CONTRACTOR CERTIFICATION OF NON-ASBESTOS AND NON LEAD MATERIALS

PROJECT NAME AND LOCATION:_____ EAPC FILE:_____

BUILDING OWNER AND ADDRESS_____

CONTRACTORS NAME:_____

Address:_____

Telephone No._____

The contractor hereby certifies that he, his subcontractors, and his suppliers have used or will use only non-asbestos containing materials and non-lead paints and no lead in the water systems in the construction of this project.

by: (Signature) _____ Date _____

(Print Name)_____

(Print Title)_____

NOTE: "Asbestos-Free" materials are not allowed on this project as the definition of "asbestos-free" materials allows asbestos content up to 1%. Only non-asbestos containing materials (which have no asbestos) are allowed.

INDEMNIFICATION

a) The CONTRACTOR will indemnify and hold harmless the OWNER and the ARCHITECT/ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the use in this contract of any asbestos or lead material prohibited under Section 70, Article 16, 3.5.1, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property or removal costs including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTORS, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

b) In any and all claims against the OWNER or the ARCHITECT/ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefit acts.



ASBESTOS NOTIFICATION OF DEMOLITION AND RENOVATION

North Dakota Department of Health

Division of Air Quality

SFN 17987 (03/17)

I. Type of Notification

THIS NOTICE MUST BE SUBMITTED 10 WORKING DAYS BEFORE BEGINNING THE ACTIVITY

☐ Original ☐ Revised ☐ Cancelled

Date:

II. Type of Operation

☐ Demolition ☐ Renovation ☐ Ordered Demolition ☐ Emergency Renovation

III. Is Asbestos Present?

☐ Yes ☐ No

IV. Dates of Asbestos Removal (MM-DD-YY)

V. Dates of Demolition or Renovation (MM-DD-YY)

Start: Stop:

Start: Stop:

VI. Facility Information (identify owner and operator, if applicable)

Owner Name			
Owner Address	City	State	Zip Code
Contact Person	Email	Telephone Number	
Operator (if different than owner)			
Operator Address	City	State	Zip Code
Contact Person	Email	Telephone Number	

VII. Facility Description (include building name, number and floor or room number)

Building Name				
Building Address	City	State	Zip Code	County
Site Location (floor or room number(s))				
Building Size (Sq. Ft.)	Number of Floors		Age of Building/Year Built	
Present Use	Prior Use			

VIII. Asbestos Contractor (If applicable, please enter Demolition or Renovation Contractor information on page 2)

Contractor Name			ND License Number	
Contractor Address	City	State	Zip Code	
Contact Person				Telephone Number

IX. Asbestos Inspector

Firm Name			ND License Number	
Firm Address	City	State	Zip Code	
Name of Inspector				Telephone Number

X. Approximate Amount of Asbestos, Including:

	Regulated Asbestos-Containing Material (RACM) to be Removed	Nonfriable Asbestos-Containing Material to be Removed		Nonfriable Asbestos-Containing Material not to be Removed	
		Category I	Category II	Category I	Category II
Pipe (Linear Ft.)					
Surface Area (Sq. Ft.)					
Volume from Facility Component(s) (Cu. Ft.)					

XI. Testing Procedure for Determining Asbestos and Type of Asbestos Material(s)

☐ PLM ☐ TEM ☐ Other:	Type of Asbestos-Containing Material(s)
---	---

XII. Description of Work Practices and Engineering Controls to Prevent Asbestos Emissions (check all that apply)

☐ Adequately Wet Materials	☐ Glove Bag	☐ Seal in Leaktight Containers	☐ Encapsulate
☐ Negative Air Containment	☐ Seal in Leaktight Wrapping	☐ Mini-enclosure	☐ Other:

XIII. Description of Planned Demolition or Renovation Work (backhoe, bulldozer, hand removal, etc.)

Will the Facility or Facility Debris be Burned?
☐ Yes ☐ No If yes, you must contact your local Health Unit or the Air Quality Division at 701.328.5188, to complete an Open Burn Variance Application: SFN 8509.

XIV. Demolition Contractor

Firm Name		Secretary of State License Number	
Firm Address	City	State	Zip Code
Contact Person		Telephone Number	

XV. Waste Transporter

Name		Waste Hauler Permit Number	
Address	City	State	Zip Code
Contact Person		Telephone Number	

XVI. Waste Disposal Site for Asbestos-Containing Materials

Name	Permit Number	Telephone Number	
Address	City	State	Zip Code
Will the waste be disposed of at a site other than a Landfill approved for asbestos? ☐ Yes ☐ No If yes, you must contact the Waste Management Division at 701.328.5166 to complete an Inert Waste Disposal Variance Application: SFN 50278.			

XVII. Waste Disposal Site for Demolition or Renovation Materials (other than asbestos)

Name	Permit Number	Telephone Number	
Address	City	State	Zip Code

XVIII. If Demolition was Ordered by Government Agency, Identify the Agency and Attach a Copy of the Order

Authority/Agency	Date of Order (MM/DD/YY)	Telephone Number
------------------	--------------------------	------------------

XIX. Emergency Demolition or Renovation

Is this an emergency demolition or renovation? ☐ Yes ☐ No If yes, you must contact the Department at 701.328.5188.

XX. Description of Procedures to be Followed in the Event of an Unexpected Asbestos Fiber Release

--

XXI. General Comments

--

XXII. I certify to the best of my knowledge that the above information is true and correct. I further certify that all asbestos abatement work on this project will be performed by individuals certified in accordance with the North Dakota Air Pollution Control Rules 33-15-13.

Signature of Owner/Operator	Print Name	Date
Business/Organization	Telephone Number	

Return form to: North Dakota Department of Health
 Division of Air Quality, 2nd Floor
 918 E Divide Avenue
 Bismarck, ND 58501-1947
 Telephone: 701.328.5188 or Fax: 701.328.5185 (If faxing, original copy must be mailed with valid signature)

INSTRUCTIONS FOR COMPLETING THE ASBESTOS DEMOLITION AND RENOVATION NOTIFICATION FORM

GENERAL INFORMATION

The Asbestos NESHAP, Section 33-15-13-02 of the North Dakota Air Pollution Control Rules, requires written notification of demolition or renovation activities in facilities under Subsection 02.6. In most cases, a facility includes all types of structures except single family homes and apartment buildings having no more than four units. The enclosed form must be used to fulfill this requirement. Only complete notification forms will be accepted.

The notification should be typewritten or neatly printed and postmarked or delivered no later than ten working days prior to the beginning of either the asbestos removal activity (Section IV) or demolition activity (in Section V) whichever is applicable.

INSTRUCTIONS

- I. Type of Notification: Check "Original" if the notification is a first time or original notification," Revised" if the notification is a revision of a prior notification, or "Canceled" if the activity has been canceled. On the right side enter the date that the notification is being submitted.
- II. Type of Operation: Check as appropriate for facility demolition, for facility renovation, for ordered demolitions, or for emergency renovations.
- III. Is Asbestos Present? Answer "Yes" or "No."
- IV. Scheduled Dates of Asbestos Removal (MM-DD-YY): Enter scheduled dates (month/day/year) for asbestos removal work. Asbestos removal work includes any activity, including site preparation, which may break up, dislodge or disturb asbestos material.
- V. Scheduled Dates of Demolition/Renovation (MM-DD-YY): Enter scheduled dates (month/day/year) for beginning and ending the planned demolition or renovation project.
- VI. Facility Information: Enter the names, addresses, contact persons and telephone numbers of the following:
- Owner: Legal owner of the site at which asbestos is being removed or demolition planned.
- Operator: Demolition contractor, general contractor, or any other person who leases, operates, controls or supervises the site.
- If known, the name of the site supervisor should be entered as the contact person for the notification. If additional parties share responsibility for the site, demolition activity, renovation or ACM removal, include complete information (including name, address, contact person and telephone number) on additional sheets submitted with the form.
- VII. Facility Description: Provide the following information on the areas being renovated or demolished:
- | | |
|---------------------------------|---|
| Building Address: | Physical location of site. |
| Building Size: | The building size in square feet. |
| Number of Floors: | Enter the number of floors including basement, if applicable. |
| Year Facility was Built or Age: | Enter approximate age of the facility. |
- Present Use/Prior Use: Describe the primary use of the facility or enter the following codes: H -- Hospital; S -- School; P -- Public Building; O -- Office; I -- Industrial; U -- University or College; C -- Commercial; or R -- Residence.
- VIII. Asbestos Contractor: Name and address of contractor hired to remove asbestos.
- IX. Asbestos Inspector: The firm who conducted the asbestos inspection prior to demolition/renovation.

- X. Approximate Amount of Asbestos Including: (1) Regulated ACM to be removed (including nonfriable ACM to be sanded, ground or abraded); (2) Category I and Category II nonfriable asbestos containing material (ACM) to be removed; and (3) Category I and Category II nonfriable asbestos containing material not to be removed. For both renovations and demolitions, enter the amount of RACM to be removed by entering a number in the appropriate box. If applicable, enter the amount of nonfriable ACM to be removed during a demolition or renovation, and/or enter the amount of nonfriable ACM not to be removed during a demolition or renovation.

Category I nonfriable material includes packing, gaskets, resilient floor covering and asphalt roofing materials. Category II nonfriable material includes any material, excluding Category I materials, that when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure, or mechanical forces expected to operate on the material during the demolition or renovation activity. All Category II materials must be removed prior to demolition.

Complete the volume from facility component(s) if asbestos-containing materials have been removed from facility components and the volume is known.

- XI. Asbestos Testing Procedure and Type of Asbestos Materials Present: Check the appropriate box for the procedure that was used to determine asbestos content. Also, describe the kinds of asbestos-containing materials that are present.
- XII. Description of Work Practices and Engineering Controls to Prevent Asbestos Emissions: Check the appropriate box(s) for work practices that will be employed to prevent asbestos emissions.
- XIII. Description of Planned Demolition or Renovation Work: Include a brief description of the renovation/demolition technique(s) to be used. Also, indicate if the facility or facility debris will be burned.
- XIII. Demolition or Renovation Contractor: Name and address of contractor hired to perform demolition or renovation work.
- XV. Waste Transporter(s): Enter the name(s), addresses(s), contact person(s) and telephone number(s) of the person(s) or company(ies) responsible for transporting ACM from the removal site to the waste disposal site. If the removal contractor or owner is the waste transporter, state "same as owner" or "same as removal contractor." If multiple parties are responsible include complete information on an additional sheet and submit with this form.
- XVI. Waste Disposal Site for the Asbestos-Containing Materials: Identify the waste disposal site, including the complete name, location, and telephone number of the facility. If ACM is to be disposed of at more than one site, provide complete information on an additional sheet submitted with the form. Permit number(s) must be included. If the waste will not be disposed of at a landfill approved for asbestos, then an Inert Waste Disposal Variance Application must be completed and approved by the Department.
- XVII. Waste Disposal Site for Demolition or Renovation Materials: Identify the waste disposal site, including the complete name, location, and telephone number of the facility. If the waste will not be disposed of at a landfill approved for waste materials, then an Inert Waste Disposal Variance Application must be completed and approved by the Department.
- XVIII. If Demolition Ordered by a Government Agency, Please Identify the Agency below: Provide the name of the responsible official, title and agency, authority under which the order was issued and the date of the order. A copy of the order from the government agency must be attached to this form.
- XIX. Emergency Demolition or Renovation Information: Please identify if the work is an emergency demolition or renovation. If yes, please immediately contact the Department.
- XX. Description of Procedures to be Followed in the Event that Unexpected Asbestos Fiber Release: Provide adequate information to demonstrate that appropriate actions have been considered and can be implemented to control asbestos emissions adequately, including at a minimum, conformance with applicable work practice standards. Attach an additional sheet of paper if needed and submit with this form.
- XXI. General Comments: as necessary. Attach an additional sheet of paper if needed and submit with this form.
- XXII. Verification and Certification: Certify the accuracy and completeness of the information provided and the intent to comply with the North Dakota Air Pollution Control Rules by signing and dating the notification form. Please sign and print the name of the owner or operator and list the business or organization the owner or operator is affiliated with.

AIA® Document G706® – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*
Hoffman Auditorium Renovation - Cyril
Moore Hall
500 University Ave W
Minot, ND 58707

ARCHITECT'S PROJECT NUMBER:
20262120
CONTRACT FOR:
CONTRACT DATED:

OWNER: ☒
ARCHITECT: ☒
CONTRACTOR: ☒
SURETY: ☐
OTHER: ☐

TO OWNER: *(Name and address)*
State Board of Higher Education dba Minot
State University
500 University Ave W
Minot, ND 58707

STATE OF: North Dakota
COUNTY OF: Ward

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment.
Whenever Surety is involved, Consent
of Surety is required. AIA Document
G707, Consent of Surety, may be used
for this purpose
Indicate Attachment ☐ Yes ☐ No

*The following supporting documents should
be attached hereto if required by the Owner:*

1. Contractor's Release or Waiver of
Liens, conditional upon receipt of final
payment.
2. Separate Releases or Waivers of Liens
from Subcontractors and material and
equipment suppliers, to the extent
required by the Owner, accompanied by
a list thereof.
3. Contractor's Affidavit of Release of
Liens (AIA Document G706A).

CONTRACTOR: *(Name and address)*

CONTRACTOR'S Authorized Representative *(Signature)*

(Printed name and title)

Date

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

AIA® Document G706®A – 1994

Contractor's Affidavit of Release of Liens

PROJECT: <i>(Name and address)</i> Hoffman Auditorium Renovation - Cyril Moore Hall 500 University Ave W Minot, ND 58707	ARCHITECT'S PROJECT NUMBER : 20262120	OWNER: [X]
TO OWNER: <i>(Name and address)</i> State Board of Higher Education dba Minot State University 500 University Ave W Minot, ND 58707	CONTRACT FOR:	ARCHITECT: [X]
	CONTRACT DATED:	CONTRACTOR: [X]
		SURETY: []
		OTHER: []

STATE OF: North Dakota
COUNTY OF: Ward

The undersigned hereby certifies that to the best of the undersigned's knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR: *(Name and address)*

CONTRACTOR'S Authorized Representative *(Signature)*

(Printed name and title)

Date

Subscribed and sworn to before me on this date:

Notary Public:
My Commission Expires:

AIA® Document G707™ – 1994

Consent of Surety to Final Payment

PROJECT: *(Name and address)*

Hoffman Auditorium Renovation - Cyril
Moore Hall
500 University Ave W
Minot, ND 58707

ARCHITECT'S PROJECT NUMBER:

20262120

CONTRACT FOR:

CONTRACT DATED:

OWNER: ☒

ARCHITECT: ☒

CONTRACTOR: ☒

SURETY: ☐

OTHER: ☐

TO OWNER: *(Name and address)*

State Board of Higher Education dba Minot
State University
500 University Ave W
Minot, ND 58707

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

on bond of

(Insert name and address of Contractor)

, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall
not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

State Board of Higher Education dba Minot State University
500 University Ave W
Minot, ND 58707

, OWNER,

as set forth in said Surety's bond.

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

Attest:

(Seal):

SURETY *(Signature)*

(Printed name and title)

AIA® Document G716™ – 2004

Request for Information (“RFI”)

TO:

EAPC Architects Engineers

FROM:

PROJECT:

Hoffman Auditorium Renovation - Cyril Moore Hall
500 University Ave W
Minot, ND 58707

ISSUE DATE:

RFI No.:

REQUESTED REPLY DATE:

PROJECT NUMBERS:

COPIES TO:

RFI DESCRIPTION: *(Fully describe the question or type of information requested.)*

REFERENCES/ATTACHMENTS: *(List specific documents researched when seeking the information requested.)*

SPECIFICATIONS:

DRAWINGS:

OTHER:

SENDER'S RECOMMENDATION: *(If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)*

RECEIVER'S REPLY: *(Provide answer to RFI, including cost and/or schedule considerations.)*

By: _____

Date: _____

COPIES TO _____

Note: This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work must be executed in accordance with the Contract Documents.



SUBSTITUTION REQUEST FORM

☐ Original ☐ Submittal ☐ Revised/Corrected Submittal

Project		Date	
Location		File No.	
Architect Engineer		No. of Copies	

Submittal Item		
Spec No.	Description	Supplier

Deviations		
Item	Deviation Description	EAPC Comments

(Use additional sheets and attach to this form if required)

Item(s) have been checked for compliance with specification requirements and space limitations and will meet these conditions.

Requested By: _____ Date: _____

Phone Number: _____ Email: _____

A/E Action

☐ Acceptable ☐ Acceptable as Noted ☐ Not Acceptable ☐ Revise and Resubmit

This action applies to Design, Arrangement and Interpretation. Acceptance Does Not relieve the Contractor of responsibility of Dimensions, Quantities, or Deviations from the Drawings or Specifications.

By: _____ Date: _____

EAPC

THIRD PARTY USER AGREEMENT FOR ELECTRONIC DRAWING DATA

The User agrees to comply with the following terms and conditions:

1. Electronic Data is defined as a .dwg or .rvt files or any derivative from such files or any form of electronic media used for purposes of construction.
2. All dimensions shown on contract documents are not verified and are not to be reused.
3. Details and elevations shown on contract documents are only for design and need to be completely redone by the detailer for erection purposes.
4. Engineers Architects, P.C. dba EAPC Architects Engineers ("Architect") retains all rights to ownership of the Electronic Data and any intellectual property associated with architectural/engineering services provided by the Architect on the Project and the Electronic Data made available to the User. User specifically acknowledges that such Electronic Data is the proprietary information of the Architect and is provided to the User solely for the purposes of facilitating the User's work on the Project. No permission is granted to the User for copying or reusing Electronic Data on other projects, for additions to this Project, or the completion of the Project by another architectural/engineering firm or individuals. Any use of the Electronic Data by the User other than the facilitation of the User's work on this Project is subject to written approval of the Architect, which approval may be withheld for any reason. Approval may be contingent on the User paying additional compensation to the Architect and providing the appropriate legal protection to the Architect for the User's use of the Electronic Data.
5. The Electronic Data represents only a portion of the engineer and architectural services performed by the Architect on the Project. Engineer represents and the User specifically acknowledges that the Electronic Data may not contain all changes to the documents since the initial release for bidding or that such Electronic Data is without inaccuracies. Use of the Electronic Data by the User, without the Architect's written verification or adaptation for the specific purpose intended, will be at the User's risk. The User may request the Architect's written verification or adaptation that the Electronic Data is current and that it is otherwise supported by additional documentation. If requested, the Architect will provide such verification or adaptation provided the User fully compensates the Architect for providing the requested information, which compensation will be determined in the sole discretion of the Engineer.
6. The User specifically acknowledges the following:
 - a. The Electronic Data documents are provided by the Architect for the convenience of the User only.
 - b. The Electronic Data documents are prepared as the Architect's internal working documents and as such may be incomplete, contain deliberate or unintentional inaccuracies or be in part obsolete.



- c. That the Architect makes no representation as to the Electronic Data completeness, currency, or accuracy, or compatibility with the User's software systems.
 - d. Any translation of Electronic Data from one computer system or computer environment can and often does result in the loss of important Electronic Data, including portions of test and dimensions, the existence, location or scale of symbols or other elements of graphics, the internal structure of Electronic Data including layers and Electronic Data attributes, or the style or weight of lines. The Architect specifically disclaims any liability associated with the User's use of the Electronic Data on any system.
 - e. The Architect will not routinely issue updates to its Electronic Data. It is solely the responsibility of the User to identify and make all required revisions or corrections to this Electronic Data or request a verification or adaptation from the Engineer.
7. Because the information being provided by the Architect to the User is being provided "AS IS" "with all faults", in the software release version standard to the Architect; and without representation by the Architect as to completeness, currency, or accuracy, the User specifically agrees to defend, indemnify and hold harmless the Architect, its affiliated entities, directors, officers, and employees from and against any and all claims arising out of the User's use of the Electronic Data and the preparation of information generated by the User through the Architect's Electronic Data. The indemnification shall include the User's agreement to pay all reasonable attorney's fees and expenses incurred by Architect in defending against any claim or action. In no event will Architect, its affiliated entities, directors, officers, and employees be liable to the User for indirect, general, incidental, consequential, or other damages.
8. The utilization of the Electronic Data by the User contrary to the terms and conditions of this Agreement shall constitute a breach of this Agreement and User, immediately upon the written demand of the Architect, shall return to the Architect all of the Architect's property, including the Electronic Data. Architect shall be entitled to seek all other claims arising out of the User's breach of this Agreement.
9. Attached hereto and incorporated by reference herein as Exhibit "A" is a written description outlining the Electronic Data requested by the User which includes such information as sheet number and special instructions relating to the Electronic Data. Also included on Exhibit "A" is information with regard to the compensation to be paid by the User to the Architect for the time and expense incurred by the Architect in the preparation and transfer of the Electronic Data. Special instructions relating to the Electronic Data to be included or excluded may be requested and may not require additional compensation. The Architect will not provide assurances that all special instructions can be accommodated.
10. This agreement shall be binding upon the respective successors and assigns of the parties hereto. User acknowledges that the Electronic Data will not be provided until a signed Agreement is on file with the Architect and total payment is received.



EXHIBIT A: ELECTRONIC FILE REQUISITION & RELEASE FORM

DATE: _____

Please complete the following information and remit a check for the "Total Amount Due" to EAPC Architects Engineers with the completed request form. Signature by the firm's representative and or payment with this completed request will constitute an agreement with the terms and conditions listed on the preceding two pages (Third Party User Agreement for Electronic Data).

PROJECT INFORMATION:

Project Name: _____

Project Location: _____

USER INFORMATION:

Company: _____

Representative Name: _____ Signature: _____

Address: _____ Dated: _____

City/State/Zip: _____

Telephone No.: _____

DRAWINGS REQUESTED:

Intended use of Drawings: _____

File(s)/Drawing Numbers needed (including file specification suffix and software version): _____

TOTAL AMOUNT DUE: _____

SECTION 00 3003.C - SUPPLEMENTARY CONDITIONS TO AIA A101-2017, EXHIBIT A

AIA A101-2017, EXHIBIT A - INSURANCE AND BONDS

PART 1 - ARTICLE A.5 - SUPPLEMENTARY CONDITIONS

2.1 §A.5.1 SUPPLEMENTS

- A. These General Conditions of the Contract for Construction (AIA Document A201 - 2017, 15 Articles on 38 pages) are hereby made part of the Contract Documents whether bound herein or not. This Article A.5 contains changes and additions to the AIA A101 – 2017, Exhibit A, cross referenced to the original Article numbers in AIA A101 – 2017, Exhibit A. Where any part of AIA A101 – 2017, Exhibit A is not modified or voided by this Article A.5 or Division 1 Specifications Sections, the unaltered part remains in effect.

2.2 ARTICLE A.1 - GENERAL *NO SUPPLEMENT*

2.3 ARTICLE A.2 - OWNER'S INSURANCE

A. §A.2.3 Required Property Insurance

1. **§A.2.3.1; Add:** The Vandalism and Malicious Mischief Endorsement will provide \$1,000.00 deductible that shall be covered by the Contractors if there is such an occurrence, in proportion to their loss.
2. The Owner shall have the following added to the fire insurance policy on the existing building:
 - a. Subrogation Clause: It is hereby stipulated that this insurance shall not be invalidated should the insured waive in writing, prior to a loss, all rights of recovery against any party for loss occurring to the property described herein.
3. The Owner has this building insured with the State fire and tornado fund. A request for waiver of the right of subrogation may be requested by the General Contractor to the North Dakota Commissioner of Insurance. When doing so, identify the building, extent of work and value of total construction. This provision is outlined in chapter 26.1-22-22 of the ND Century Code as amended.

2.4 ARTICLE A.3 - CONTRACTOR'S INSURANCE AND BONDS

A. §A.3.1 General

1. **§A.3.1.1 Certificate of Insurance; Add:** Proof of insurance coverage may be a fully descriptive, standard AIA or ACCORD Certificate of Insurance Agent's description of coverages provided the Contractor. The Architect will not warrant that information contained on the Certificate is correct, nor does the Architect warrant that the coverages and limits of liability will not be changed by the Contractor or the insurance company during the term of the Work.
2. The Contract will not be signed until the Owner has received the proof of liability insurance coverage and the Waiver of Subrogation specified in the Supplementary Conditions. See Section 00 3000 for form of Waiver of Subrogation.

B. **§A.3.2.2 Commercial General Liability**

1. **§A.3.2.2.1; Add:** Liability Insurance shall comply with the following:
 - a. General Liability written on one of the following forms:
 - 1) Comprehensive General Liability including Premises, Operations, Independent Contractors, Products, Completed Operations and the Broad Form Comprehensive General Liability Endorsement. XCU coverage shall be included if applicable.
 - b. OR
 - 1) Commercial General Liability on an Occurrence Basis including Premises/Operations, Products/Completed Operations and Personal Injury. There shall be no endorsements deleting XCU coverages if applicable.
 - c. Automobile Liability: Written on a Business Auto Policy with liability covered auto symbols (1) or (7, 8, and 9) or (2, 8, and 9). If the carrier does not use the Business Auto Policy, an equivalent form providing liability coverage on a comprehensive basis including all owned, non-owned and hired autos shall be used.
 - d. Umbrella Liability or Excess Liability with minimum limits of \$1,000,000 per occurrence and \$2,000,000 aggregate. The self-insured retention, if written on an umbrella liability form, shall not exceed \$10,000. The policy shall provide a minimum of following form liability over the previous specified general liability and automobile liability. The amounts listed for Umbrella coverage include the total of the amount of the basic coverage plus the Umbrella coverage. A separate Umbrella policy is not required if the basic coverage is as large as the total specified.
 - e. Contractor's Property Damage Insurance specified shall cover property that the Contractor did not provide and that is damaged by the Contractor while working on other items in the vicinity.
 - f. The limits on the basic policies may be any amount acceptable to the Insurer furnishing the umbrella or excess coverage.
 - g. The Architect and Owner assume no responsibility in the event that the limits set above are not adequate.
 - i. Comprehensive General Liability or Commercial General Liability and Automobile Liability coverages shall be written by the same insurer. The insurance shall be placed with insurers rated "A" or better by A.M. Best Company, Inc.
 - j. Contractor's insurance coverage shall be primary (i.e. pay first) as respects any insurance, self-insurance or self-retention maintained by the Owner or Architect. Any insurance, self-insurance or self-retention maintained by the Owner shall be in excess of the Contractor's insurance and shall not contribute with it.
 - k. The Owner and Architect and their officers and employees shall be endorsed as additional insured on the Contractor's general liability and automobile liability policies.
 - l. All subcontractors shall maintain the same scope of insurance required of the Contractor. The Prime Contractor shall ensure compliance with this requirement.
 - m. Commercial General Liability insurance for the project written on an occurrence form with policy limits of not less than one million \$1,000,000.00 each occurrence, two million dollars \$2,000,000.00 general aggregate, and two million dollars \$2,000,000.00 aggregate for products completed operations hazard.
 - n. Automobile liability one million dollars \$1,000,000.00 per accident – see paragraph A.3.2.3.
 - o. Umbrella Policy two million dollars \$2,000,000.00

- p. Worker's Compensation: Statutory limits under applicable State or Federal Statutes.
- q. Waiver of Subrogation where allowed by State law of the project location.
- r. Alternative Employer endorsement (WC 00 03 01A) in favor of EAPC.

C. **§A.3.3 Contractor's Other Insurance Coverage**

1. **§A.3.3.2.1; Add to paragraph:**

- a. Builder's Risk Insurance as specified in A.2.3 shall be taken out and paid for by the Contractor rather than the Owner, and shall be on a Completed Value form. The Vandalism and Malicious Mischief Endorsement may provide a deductible amount. In case of a loss under that Endorsement, the Contractor shall pay the deductible amount. This insurance shall include coverage against lightning, hail, explosion, riot or civil commotions, aircraft and other vehicles, collapse and coverage available under the so called Installation Floater.
- b. Builder's Risk Insurance shall be on new portions of old building during remodeling.
- c. If separate Mechanical and Electrical contracts are being bid, the General Contractor shall include in their bid the premium on an amount equal to 100% of their base bid plus all add alternates, plus 50% of their bid to cover other contracts including the portion of the Architect's fee in connection with any loss. The Contractor amount shall be adjusted for the difference between the premium on this estimated amount and the actual amount.
 - 1) If one single contract is being bid, each General Contractor shall include in their bid the premium on the entire construction amount including all add Alternates plus 1% for the Architect's fee.
- d. The Contract will not be signed until the Owner has received from the Contractor the proper policy and one copy thereof for the insurance specified under this Article.
- e. If there are separate Mechanical and Electrical contracts and the General Contractor obtains property insurance with a stipulated amount deductible under the terms of the policy, the cost of such deductible amount required on claims paid by the insurance shall be paid as follows: 1) For claims made by Mechanical and Electrical Contractors, the Contractor making the claim shall pay the deductible amount, up to \$1,000.00, for each claim. If the deductible amount is larger, the General Contractor shall pay the difference between \$1,000.00 and the actual deductible amount. 2) For claims made by the General Contractor, the General Contractor shall pay the total deductible amount. 3) For claims involving more than one Contractor's Work, the deductible amount shall be assessed to each Contractor on the basis of percent of involvement in the claim by each.
- f. All references in this and other sections of Exhibit A that refer to the Owner as fiduciary for this type of insurance shall be changed to place the General Contractor as fiduciary.

D. **§A.3.4 Performance Bond and Payment Bond**

1. ***Replace text with:***

- a. The Contractor shall furnish bond or bonds as described below, covering the faithful performance of the Contract and the payments of all obligations arising thereunder. The Contract will not be signed until the owner has received the proper bond specified under this Article, issued by a bonding company licensed to do business in the State where the construction will take place.

- b. Where there is State or Federal bond forms required by statute or regulations, the bond or bonds shall be on those forms, in the amount of 100% of the Contract Price.
- c. Where no such requirements exist, furnish both AIA A312 Performance Bond and AIA A312 Labor and Material Payment Bond, each in the amount of 100% of the Contract Price.
- d. Bond amounts shall not exceed the single bond limit for the Contractor's bonding company as set forth in the Federal Register current as of the bid date.

2.5 ARTICLE A.4 SPECIAL TERMS AND CONDITIONS - *NO SUPPLEMENT*

END OF SECTION 00 3003.C

SECTION 00 7000 - GENERAL CONDITIONS

PART 1 GENERAL

1.1 CONTENTS

- A. This Section contains the printed standard document AIA Document A201 - 2017, General Conditions of the Contract for Construction, 15 Articles on 47 pages.
- B. It also contains Article 16, Supplementary Conditions, which has changes and additions to the printed AIA standard document.
- C. The printed standard document as modified by Article 16, both included in this Section 00 7000, applies to this Project except to the extent that it is supplemented for this Project by Division 1 Sections.



AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Hoffman Auditorium Renovation - Cyril Moore Hall
500 University Ave W
Minot, North Dakota 58707

THE OWNER:

(Name, legal status and address)

State Board of Higher Education dba Minot State University
500 University Ave W
Minot, North Dakota 58707

THE ARCHITECT:

(Name, legal status and address)

Engineers-Architects, P.C. (herein known as EAPC Architects Engineers)
2080 36th Ave SW, Suite 210
Minot, ND 58701

ADDITIONS AND DELETIONS:

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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™–2017, Guide for Supplementary Conditions.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. 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.

§ 1.2 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.

§ 1.6 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 Digital Data Use and Transmission

The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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

§ 2.2 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.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 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. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 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.

§ 2.4 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.

§ 3.2 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.

§ 3.3 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.

§ 3.4 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.

§ 3.5 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.

§ 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.

§ 3.6 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 and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

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

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 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.

§ 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.

§ 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

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.

§ 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.

§ 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 negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The 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.

§ 5.4 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.

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.

§ 7.3 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.

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.

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

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims,

security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 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.

§ 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.

§ 9.10.3 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; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 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.

§ 10.3.2 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 provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

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

§ 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.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring

the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 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, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, 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.

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. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 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. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 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. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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

§ 15.3 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.

SECTION 00 7000.1 - ARTICLE 16 - SUPPLEMENTARY CONDITIONS

PART 1 SUPPLEMENTARY CONDITIONS

1.1 SUPPLEMENTS

- A. These General Conditions of the Contract for Construction (AIA Document A201 - 2017, 15 Articles on 47 pages) are hereby made part of the Contract Documents whether bound herein or not. This Article 16 contains changes and additions to the AIA A201, cross referenced to the original Article numbers in AIA A201 - 2017. Where any part of AIA A201 - 2017 is not modified or voided by this Article 16 or Division 1 Specifications Sections, the unaltered part remains in effect.

1.2 ARTICLE 1 - GENERAL PROVISIONS

- A. **§1.1.3 The Work**

- 1. **Add:** The term "provide" shall mean furnish and install in place.

- B. **§1.1.5 The Drawings**

- 1. **Add:** The general character and scope of the Work is shown by the Drawings. Where a portion of the Work is fully drawn and the remainder is merely indicated, the portion fully drawn shall apply to all similar part of the Work. Figured dimensions shall be followed in preference to scaled measurements. Dimensions on the Drawings are subject to field verification to suit adjacent elements.

- C. **§1.1.6 The Specifications**

- 1. **Add:** Where Specifications are abbreviated type, they indicate complete sentences in the same manner as when a note occurs in the Drawings. Omissions of words such as "the Contractor shall" and "as shown on the Drawings" is intentional. The words "shall" or "shall be" are to be supplied by inference.
 - a. Where a number is listed in the Specifications (as for gauges, weights, temperatures, amount of time, etc.), the number shall be interpreted as that or better.
 - b. Division 00 and Division 01 of this book apply to every Specification Section in this book.

- D. **§1.2 Correlation and Intent of the Contract Documents**

- 1. **§1.2.1; Add:** Change the period at the end of the first sentence to a comma and add: "in operating order".
 - 2. **Add new paragraph:**
 - a. **§1.2.4** In case of a conflict between the Contract Documents and any portion bid separately to the owner, if not reconciled by Addendum, the Architect/Engineer will determine which document is the most specific and the Contractor shall do the Work accordingly, at no change in price.

1.3 ARTICLE 2 - OWNER

- A. **§2.3 Information and Services Required of the Owner**

1. **§2.3.6; Replace text with:** The Contractor(s) will be furnished as many sets of Drawings and Project Manuals as the Architect has available for distribution, but in no case less than one (1). If the Contractor(s) require additional sets, they will be furnished to the Contractor(s) at the cost of reproduction, and postage and handling, to be paid by the Contractor(s).

1.4 ARTICLE 3 - CONTRACTOR

A. §3.3 Supervision and Construction Procedures

1. *Add new paragraphs:*

- a. **§3.3.1.1** Where multiple Prime Contracts are in effect the [General] Contractor's schedule, prepared in accordance with Article 3.10.1 of these Supplementary Conditions and progress shall govern the Work of the other Prime Contractors. Each Contractor shall notify other Prime Contractors, within a reasonable time, of phases or items of the Work requiring incorporation of Work by the other Prime Contractors. The other Prime Contractors shall, after such notification and within a reasonable time, proceed with the furnishing, installation, laying out or incorporation of their Work so as not to delay or impede the progress of the Work.
- b. **§3.3.1.2** Each Prime Contractor shall be responsible for the regular and on-going coordination of their Work with the affected Work of other Prime Contractors and for maintaining and coordinating the progress of the Work in accordance with the construction schedule, prepared in accordance with Article 3.10.1 of these Supplementary Conditions for scheduling requirements.

B. §3.4 Labor and Materials

1. *Add new section:*

a. **§3.4.4 Workmanship and Materials**

- 1) **.1** No trade shall commence Work until conditions are right for carrying out the Work properly, and surfaces affecting the Work of that trade are suitable.
- 2) **.2** Manufacturer's printed instructions covering details of installations shall be followed where not in conflict with these Specifications. If there is a conflict, notify the Architect and obtain approval before proceeding.
- 3) **.3** Completed Work shall be left plumb, level, true to line or plane, anchored securely in place, free from damage.
- 4) **.4** Unless otherwise called for, all pieces of material shall be as large a stock size as is in conformity with standard good practice of the trade.
- 5) **.5** Except where in conflict with these specifications, current manufacturer's printed specifications of herein specified proprietary products are made part of these specifications.
- 6) **.6** Deliver and store materials so as to protect from damage. Inspect materials for damage as delivered.
- 7) **.7** For items fabricated to fit the needs of this project, verify dimensions by field measurements where practical. Establish Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

- 8) **.8** For brand name materials where purchase method allows: Deliver in original container with seals unbroken and with original labels with manufacturer's name, product brand name and directions intact.
- 9) **.9** Where these specifications call for products that meet national standards (such as ASTM, CS, Federal Specifications, etc.), furnish a certification from the manufacturer that those products do meet the specified standards.
- 10) **.10** Obtain each separate type of product from the same manufacturer.
- 11) **.11** Before each trade commences work, conduct a pre-installation conference at the area of the site where the work will begin. The conference shall include the General Contractor's Superintendent and representatives of all trades whose work interfaces with the trade about to begin work. The purpose will be to determine that conditions are proper for beginning the work and assure that other trades will coordinate as needed.

C. **§3.6 Taxes**

1. **Add new paragraph:**

- a. **§3.6.1** Contractor shall pay the ND Use tax per section 57-40.202.1 of the Century Code. Use tax applies to the purchase of tangible personal property by an individual or business not taxed at the time of purchase for storage, use or consumption in North Dakota.
- b. **§3.6.1** Contractors shall be responsible for paying all required State and Municipal Use/Excise taxes on their gross receipts of material on a project including the value of material furnished by the owner per South Dakota Codified Law Chapters 10-45, 10-46 and 10-52. Subcontractors do not owe excise tax IF a prime contractor's exemption certificate is received for the project.

D. **§3.7 Permits, Fees, Notices and Compliance with Laws**

1. **§3.7.1; Add:** If separate Mechanical and Electrical Contracts are being bid, each General Contractor shall include in his bid the permit fee on an amount equal to 100% of his bid, plus all his add alternate plus 50% of this sum for the Mechanical and Electrical Contracts. The Contract amount shall be adjusted by change order for the difference between this bid amount and the actual amount.
2. **Add new section:**
 - a. **§3.7.6 Equal Opportunity Clause**
 - 1) During the performance of this contract, the Contractor agrees to follow Section 202 of "Executive Order 11246 of September 24, 1965" relative to Non Discrimination in Employment by Government Contractors and Subcontractors and/or any directive regarding Equal Opportunity Employment issued by State where the project is located.

E. **§3.10 Contractor's Construction and Submittal Schedules**

1. **§3.10.1; Add:** The Contractor with the largest Contract shall prepare the construction schedule in cooperation with the other prime Contractors and obtain written evidence of their concurrence. The first payment will not be certified by the Architect until the progress schedule is received. See also Section 01 3200.

F. **§3.11 Documents and Samples at the Site**

1. **Add new paragraphs:**

- a. **§3.11.1** Immediately upon receipt of contract documents, identify one each of the documents with the title, "RECORD DOCUMENTS - JOB SET." Update the record set with all Addenda items.
- b. **§3.11.2** Through progress of the work, the Contractor shall maintain an accurate record of changes in the contract documents, as described below. Upon completion of the work, transfer the recorded change in ink to a set of record documents. See also Section 01 7839 – Project Record Documents.
- c. **§3.11.3** Changes that shall be recorded are major concealed items from what is called for by the Contract Documents. This is to include such items as main pipes and conduit or changed structural members which cannot be observed on completion even with the use of access doors or removable panels.
- d. **§3.11.4** Coordinate changes within the record documents, making adequate and proper entries on each page of specifications and each sheet of drawings and other documents where such entry is required to show the change properly.
- e. **§3.11.5** Accuracy of records shall be such that future searches for items shown in the contract documents may rely reasonably on information obtained from the approved project record documents.
- f. **§3.11.6** Make entries within 24 hours after receipt of information that the change has occurred. Prior to submitting request for final payment, submit the final project record documents to the Architect and secure his approval. Maintain the job set of record documents completely protected from deterioration and from loss and damage until completion of the work and transfer of all recorded data to the final project record documents.
- g. **§3.11.7** Submit the completed set of project record documents to EAPC as described in Section 01 7839.
- h. **§3.11.8** Participate in review meeting as required.
- i. **§3.11.9** Make required changes and promptly deliver the final project record documents to EAPC.
- j. **§3.11.10** EAPC will review for completeness of record documents.
- 2. The purpose of the final project record documents is to provide factual information regarding all aspects of the work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site measurement, investigation, and examination.

G. §3.14 Cutting and Patching

1. *Add new paragraph:*

- a. **§3.14.3** On projects with more than one prime Contract, the General Contractor shall provide all openings in all new general construction, provided the information has been furnished to the General Contractor in time. If said information is not furnished in time, other Contractors shall cut, patch and repair as necessary all that is required for an installation per drawings and specifications. Use persons with the required skills for the work involved. Where support members are involved, cutting shall be approved in advance by the Architect/Engineer. Openings required in existing construction are the responsibility of the Contractor requiring the opening, including patching of existing construction to match adjacent finishes.

H. §3.15 Cleaning Up

1. *Add new sections:*

- a. **§3.15.1.1 Cleaning During Construction.** The building and site shall be cleaned weekly and more often if necessary to provide a safe and hazard free work place. Maintain floors broom clean. See also AIA A201.6.3.
 - b. **§3.15.1.2 Cleaning on Completion of the Building.**
 - 1) **.1** "Clean," for the purpose of this article shall be interpreted on finished surfaces as meaning the level of cleanliness generally provided by skilled cleaners using quality building maintenance equipment and materials.
 - 2) **.2** Remove all window stickers and labels.
 - 3) **.3** Clean all plumbing, heating and electrical items upon completion of the project, and before Owner's occupancy.
 - I. **§3.16 Access to Work**
 - 1. **Add new paragraph:**
 - a. **§3.16.1** The Owner will clear the building of removable equipment and supplies and allow the Contractor exclusive use of the interior spaces until Substantial Completion – under the terms stated elsewhere in these Specifications.
 - b. The Contractor shall confine the Work, the storage of items and parking within the building and the “Contract Limit Lines” shown on the Site Plan.
 - J. **§3.18 Indemnification**
 - 1. **§3.18.1; Add:** Actions that EAPC might take or fail to take with regard to Shop Drawings are to be covered by 3.18.1 to the same extent as actions in other matters.
- 1.5 ARTICLE 4 ARCHITECT
- A. **§4.1 General**
 - 1. **§4.1.2; Add:** The Architect/Engineer has no duties or responsibilities in regard to insurance or legal decisions, surveying, subsurface soil exploration, geophysical testing, soil analysis or soil testing, testing for contamination by airborne asbestos fibers, bulk sample analysis for asbestos identification and content determination. The Architect/Engineer’s obligations are solely to the Owner. In meeting such obligations, EAPC may increase the burdens and expenses of the Contractor, Subcontractors or Employees or the Surety of any of them. Nothing in the performance of EAPC’s services in connection with this project implies any undertaking for the benefit of, or which may be enforced by the Contractor, Subcontractor or Employees, or the Surety of any of them.
 - B. **§4.2 Administration of the Contract**
 - 1. **§4.2.3; Add:** The Architect will not be responsible for the acts or omissions of the Owner.
 - C. **§4.2.4 Communications**
 - 1. **Add:** If there are any direct communications between Owner and Contractor, that affect the performance or Administration of the Contract, the gist of such communication shall be reduced to writing by the Owner, with a copy to the Architect.

1.6 ARTICLE 5 - SUBCONTRACTORS *NO SUPPLEMENT*

1.7 ARTICLE 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS *NO SUPPLEMENT*

1.8 ARTICLE 7 - CHANGES IN THE WORK

A. **§7.1 General**

1. *Add new paragraph:*

- a. **§7.1.4** Divisions 00 and 01 state generally how change proposals shall be handled. When quoting on a change proposal, a Contractor shall furnish a complete and itemized list of materials involved due to a proposed change in work if so requested showing:
 - 1) The actual cost of:
 - a) Labor, including foreman, on a per item basis.
 - b) Materials, all individually priced, entering permanently into the work.
 - c) The Ownership or rental cost of construction plant and equipment during the time of use on the extra work.
 - d) Insurances, permits, fees and other direct job expenses applicable to the changes.
 - e) To the total cost of the items above, add an allowance for overhead and profit, as appropriate for the paperwork involved.
 - f) Compute add or deduct change orders on the same basis.
 - g) The Architect shall have the right to require actual quotations for materials and/or labor from the contractor or suppliers.
 - 2) *When either or both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be calculated on basis of the net amount of cost or credit.*
 - a) *The allowance for overhead and profit combined, included in the total cost shall be based on the following schedule:*
 - 1 *For the Contractor; for added work performed by the Contractor's own forces, 15 percent of the cost; for deleted work performed by the Contractor's own forces, 5 percent of the cost.*
 - 2 *For the Contractor; for added work performed by the Contractor's Subcontractor, 5 percent of the cost due the Subcontractor.*
 - 3 *For each Subcontractor or Sub-subcontractor involved; for added work performed by the Subcontractor's own forces; 15 percent of the cost; for deleted work performed by the Subcontractor's own forces; 5 percent of the cost.*
 - 4 *For each Subcontractor; for added or deleted work performed by the Subcontractor's Sub-subcontractor, 5 percent of the amount due the subcontractor.*
 - 5 *Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.4.*
 - b) *In order to facilitate the checking of quotations for extras or credit, all proposals, except those so minor that their propriety can seem by inspection, shall be accomplished by a complete itemization of costs*

including labor, materials, and subcontracts. Labor and materials shall be itemized in the manner described above. Where major cost items are subcontract, they shall be itemized also.

2. **Add new paragraph:**

- a. **§7.1.5** By signing a Change Order, the Contractor agrees that the changed Contract Amount is in full payment for the changed work, including that resulting from any resulting changes in the time schedule.

1.9 ARTICLE 8 - TIME

A. **§8.3 Delays and Extensions of Time**

1. **§8.3.1; Add:** The following will not be considered justifications for extension of time unless due to one of the causes stated within this Article 8.
 - a. Delay caused by Subcontractors or Supplier except if the Supplier goes out of business and another Supplier cannot be found in time to meet schedule.
 - b. Shortage of workmen.

1.10 ARTICLE 9 - PAYMENTS AND COMPLETION

A. **§9.2 Schedule of Values**

1. **Add:** Schedule of Values shall to suit the Contractor's judgment for the particular project following the format of the sample in Section 00 3000. Use the same form for payment requests, along with the form "Partial Payment Summary Sheet" in Section 00 3000.

B. **§9.6 Progress Payments**

1. **Add new paragraph:**
 - a. **§9.6.9** Except where other statutory requirements apply, progress payment shall be made monthly upon application, in the amount of 90% of the Work completed and materials described under 9.3.2. For a Contract over \$100 thousand, the Architect will authorize the payment of 100% of the amount completed after a total of 5% of the Contract amount has been retained, providing progress on the Work is in accordance with or ahead of the Contractor's Progress Schedule and is otherwise satisfactory to the Architect, and if the Contractor has filed a Consent of Surety with the Architect.

C. **§9.8 Substantial Completion**

1. **§9.8.1; Add:** Minor corrective Work and the replacement of defective Work or materials, and the adjustment of control apparatus will not delay the determination that the Contract is Substantially Complete. See 12.2.2.
2. **Add new paragraph:**
 - a. **§9.8.6** At 12:01 a.m. on the Date of Substantial Completion, the Owner becomes responsible for the care and operation of the accepted Work.

1.11 ARTICLE 10 - PROTECTION OF PERSONS OR PROPERTY

A. **§10.2.8 Injury or Damage to Person or Property**

1. **Add new paragraph:**

- a. **§10.2.8.1** Contractor shall submit to the Owner a copy of the written safety program to be used as guidelines and direction of the Contractor's and subcontractors' worksite activities. This program must meet all federal, state and local laws and other legal requirements and include the following minimum provisions: (1) a worksite safety policy and mission statement; (2) assigned responsibilities among management, supervisors and employees; (3) a system for periodic self-inspections, including inspection of job sites, materials, work performance and equipment; (4) a thorough accident and injury reporting and investigation process; (5) a safety orientation program including first aid, medical attention, emergency facilities, fire protection and prevention, housekeeping, illumination, sanitation, personal protective equipment and occupational noise exposure; and (6) a safety training program including safety "tool box" meetings and other systems for ongoing training, including training for employees on the recognition, avoidance and prevention of unsafe conditions.
- b. It shall be a condition of the Contract and shall be made a condition of each subcontract entered into pursuant to the contract, that the owner assumes no liability relating to its receipt and review of the Contractor's safety plan. Safety remains the responsibility of the Contractor. Furthermore, the right of the Owner to receive and review the safety plan 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.

B. §10.3 Hazardous Materials and Substances

1. **§10.3.4; Add:** Asbestos containing materials are prohibited from use in the construction of this project. The Contractor shall certify that only non-asbestos materials were used (See certification Form in Section 00 3000). Typical materials likely to contain asbestos include roofing, acoustical treatments, fireproofing, drywall, plaster, resilient flooring, insulation's, mastics/adhesives, gaskets, mineral products, cementitious boards/pipes/mortar, etc.
2. Lead containing materials are prohibited from use in the construction of this project.

1.12 ARTICLE 11 - INSURANCE AND BONDS *NO SUPPLEMENT*

1.13 ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK *NO SUPPLEMENT*

1.14 ARTICLE 13 - MISCELLANEOUS PROVISIONS

A. §13.1 Governing Law

1. **Add new paragraphs:**
 - a. **§13.1.1** Where the Contract Documents require Work better than that required by statute, the Contract Documents shall govern.
 - b. **§13.1.2** If changes in laws, regulations, or codes made after the date of the Bid Opening require substantial revisions in the scope, extent or complexity of the Work called for by the Contract Documents, an equitable adjustment will be made in the terms of the Contract.
2. **Add new sections:**
 - a. **§13.6 Notification of Demolition and Renovation**
 - 1) For any project located in North Dakota which will have either demolition or renovation, the Contractor shall fill out the Asbestos Notification of Demolition and Renovation form included in Section 00 3000, get it signed by

the Owner and send it by mail or fax and mail to the ND State Department of Health to be received by them at least 10 days before beginning the activity, all per the instructions on the form.

b. **§13.8 Liquidated Damages**

- 1) The parties acknowledge and agree that time is of the essence under the Contract, and delays in Substantial Completion of the Work beyond the date specified in the Contract, subject to adjustment as provided in the Contract, would result in harm to the Owner for lack of occupancy for the areas within the Work. The parties hereby agree to work in good faith to achieve the schedule without penalties of liquidated damages.

1.15 ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT *NO SUPPLEMENT*

1.16 ARTICLE 15 - CLAIMS AND DISPUTES

- A. **§15.3.2; Add:** Claims not resolved by mediation shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association in effect as of July 1, 2001. Any provision in such Rules to the effect that rules in effect at the time of filing of a demand for arbitration shall apply are hereby deleted, it being the intent that no amendments to the Rules shall apply to these parties. Notwithstanding the foregoing, the administrative fees to be paid shall be those in effect as of the time of filing the demand for arbitration. The demand for arbitration shall be filed in writing with the other party to the Contract and with the American Arbitration Association, and a copy shall be filed with the Architect.

END OF SECTION 00 7000.1

SECTION 00 8000 - SPECIAL CONDITIONS

PART 1 GENERAL

1.1 NORTH DAKOTA UNIVERSITY SYSTEM (NDUS) ADDENDUM TO AIA DOCUMENTS

- A.** Applies to AIA Document A101-2017 (see Specification Section 00 3000) and AIA A201-2017 (see Specification Section 00 7000).
- B.** NDUS Addendum Document prevails on supplementary Conditions. If discrepancies arise, please contact EAPC.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 00 8000

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

as amended by N.D.U.S. for the following PROJECT:

(Name and location or address)

MiSU CM Science Center Hoffman Auditorium Renovation
500 University Ave W
Minot, ND 58707

THE OWNER:

(Name, legal status and address)

State Board of Higher Education dba Minot State University
500 University Ave W

Minot, ND 58707

THE ARCHITECT:

(Name, legal status and address)

EAPC Architects Engineers
2080 - 36th Ave. SW, Suite 210

Minot, ND 58701

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ADDITIONS AND DELETIONS:

The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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™–2017, Guide for Supplementary Conditions.

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1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2

Written Interpretations

4.2.11, 4.2.12

Written Orders

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. 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.

§ 1.1.2.1 Execution of the Contract Documents; the Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request. The Contract Documents may be executed in multiple, identical counterparts, each of which is deemed an original, and all of which taken together shall constitute one and the same Contract.

§ 1.1.2.2 The Contract Documents are not effective until fully executed by both Parties.

§ 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.

§ 1.1.3.1 Contractor acknowledges and agrees that the Contract Documents are adequate and sufficient to provide for completion of the Work, and will include all work, whether or not shown or described, which reasonably may be inferred to be required for completion of the Work, in accordance with applicable laws, codes, and professional standards.

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 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 If any term or provision of the Contract Documents is declared by a court having jurisdiction to be illegal or unenforceable, the validity of the remaining terms and provisions shall not be affected, and, if possible, the rights and obligations of the parties are to be construed and enforced as if the Contract Documents did not contain that term or provision.

§ 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.

§ 1.2.4 In the case of an inconsistency between drawings and specifications or within either document, not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect's interpretation.

§ 1.2.4.1 Products: Means new material, machinery, components, equipment, fixtures, and systems forming the work, but does not include machinery and equipment used for preparation, fabrication, conveying, or erection of the work. Products may also include existing materials or components required for reuse.

§ 1.2.4.2 Furnish: To supply and deliver, unload, and inspect for damage (same as supply).

§ 1.2.4.3 Install: To unpack, assemble, erect, apply, place, connect, finish, cure, protect, clean, and ready for use.

§ 1.2.4.4 Provide: To furnish or supply, plus install.

§ 1.2.4.5 Supply: To supply and deliver, unload, and inspect for damage (same as furnish).

§ 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.

§ 1.6 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, are complete on the date postmarked, and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission with proof of delivery provided.

§ 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.

§ 1.6.3 The provisions of this Section 1.6 do not supersede any statutes or rules of court regarding notice of claims or service of process. In the event of a conflict between this section and any statutes or rules of court, the statutes or rules of court shall govern.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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

§ 2.2 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 may furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract.

§ 2.2.2 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.

§ 2.2.3 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, as authorized in advance by the Owner, or where disclosure is required by law. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 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 state of North Dakota. 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 former 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. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 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.

§ 2.4 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 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 seven-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.

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, in the state of North Dakota. 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 The Contractor shall perform as an independent entity under this Contract and not as an employee of the Owner for any purpose, including but not limited to the application of the Social Security Act, the Fair Labor Standards Act, the Federal Insurance Contribution Act, the North Dakota Unemployment Compensation Law and the North Dakota Workers' Compensation Act. Contractor will retain sole and absolute discretion in the manner and means of carrying out Contractor's activities and responsibilities under this Contract, except to the extent specified in the Contract Documents.

§ 3.1.5 Pursuant to N.D.C.C. § 43-07-20, the Contractor must give preference to the employment of bona fide North Dakota residents, as determined by N.D.C.C. § 54-01-26, with preference given first to honorably discharged disabled veterans and veterans of the armed forces of the United States, as defined in N.D.C.C. § 37-19.1-01, who are deemed to be qualified in the performance of that work. The preference shall not apply to engineering, superintendence, management, or office or clerical work.

§ 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 Drawings and other 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 as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. 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 fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely 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.

§ 3.3.1.1 Where multiple Prime Contracts are in effect the General Construction Contractor's schedule, prepared in accordance with Article 3.10.1 of these General Conditions, and progress of the work shall govern the work of the other contractors. The General Construction Contractor shall be responsible for the general coordination of the Work of all contractors with respect to the current construction schedule in order to maintain progress of the Work and to ensure the progress remains on schedule as if the General Construction Contractor were the single Prime Contractor. Each Contractor shall notify other contractors, within a reasonable time, of phases or items of the Work requiring incorporation of Work by the other contractors. The other contractors shall, after such notification and within a reasonable time, proceed with the furnishing, installing, laying out or incorporating their Work so as not to delay or impede the progress of the other contractors and the Work. Neither the Owner nor the Architect shall be responsible for the coordination of the Work between the Contractors.

§ 3.3.1.2 Each Contractor shall be responsible for the regular and on-going coordination of their Work with the affected Work of other Contractors, and for maintaining and coordinating the progress of the Work in accordance with the construction schedule, prepared in accordance with Article 3.10.1 of these General Conditions for schedule requirements.

§ 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.

§ 3.3.2.1 The Owner has an obligation to make information available to the campus on where to obtain information about Registered Sex Offenders who are working on property owned or controlled by the Owner. The Contractor has an obligation to inform the Owner in advance of any of Contractor's employees who will be on Owner's property who are Registered Sex Offenders. This obligation includes property owned or controlled by the institution that is at locations other than the main campus and extends to all sub tier contractors under the Contractor's scope of work to the extent possible. The Owner reserves the right not to allow Registered Sex Offenders to work on State Institution property.

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

§ 3.3.4 The Contractor shall submit to the Owner's Representative, prior to commencement of work on site, one copy of Material Safety Data Sheets of hazardous substances to be stored on or used on the Owner's premises in performance of this Contract. The Contractor shall also maintain copies of MSDS sheets for substances on site in

designated MSDS binder available for public inspection during normal working hours. Hazardous substances shall be any substance that is covered by Sections 312 and 324 of the Emergency Planning and Community Right-To-Know, 42 U.S.C. 11022 and 11044.

§ 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. After the Contract has been executed, the Owner and Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in General Requirements (Division 1 of the specifications)

§ 3.4.2.1 By making requests for substitutions based on Subparagraph 3.4.2 above, the Contractor:

- .1 represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified.
- .2 represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified.
- .3 certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent;
- .4 will coordinate the installation of the accepted substitute, making such changes as may be required for the work to be completed in all respects; and
- .5 represents that the Contractor states that proposed substitution will have no adverse affect on the construction schedule.

§ 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.

§ 3.5 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, including substitutions not properly approved and authorized 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.

§ 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 guarantee and maintain the stability of all work and materials and keep same in reasonable repair and condition for the period of one (1) year from the date of final acceptance of the Work but with respect to any part of the Work which the Owner takes possession of prior to final acceptance, the guarantee shall continue for a period of one year from the date the Owner takes possession. This is in addition to any manufacturer's warranty specified.

§ 3.5.4 Defects of any kind, due to faulty work or materials appearing during the above-mentioned period, must be promptly made good by the Contractor at its own expense to the entire satisfaction of the Owner and Architect. Any such construction and repairs shall include the costs of all damages to the finishes or furnishings of the building resulting from the original defect or repairs to the building. Where equipment is required to be replaced, the one-year warranty shall be reinstated for that piece of equipment from the date of replacement.

§ 3.5.5 The guarantee, as provided in paragraph 3.5 and 12.2.2, does not apply to injuries or damages occurring after final acceptance due to "acts of God," fire, violence, abuse, or carelessness of other Contractors or agents of the Owner; however, the Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding the Contractor's guarantee nor relieving the Contractor of the Contractor's responsibilities during the guarantee period and as per Section 12.2.2.1 give notice promptly after discovery of the condition.

§ 3.5.6 The guarantee, as provided in paragraph 3.5, shall be extended if other guarantees for different lengths of time are specifically called for in the Contract Documents or if manufacturer's standard warranties extend for a longer period.

§ 3.6 Taxes

§ 3.6.1 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. The Owner is not responsible for and will not pay local, state, or federal taxes. State sales tax exemption number is E-2001, and certificates will be furnished upon request by the purchasing agency.

§ 3.6.2 Contractor is not exempted from paying North Dakota Sales and Use Taxes. Contractor will assign, transfer, set over, and release to the Owner all right, title, and interest to all refunds, rebates, credits, or other amounts (including any interest thereon) arising out of the performance of the Work. Contractor agrees to take whatever action may be necessary to effect prompt collection of all refunds, rebates, credits, or other amounts (including any interest thereon) due or which may become due, and to promptly forward to Owner checks made payable to Owner for any proceeds so collected. Further, Contractor agrees to cooperate fully with Owner as to any claim or suit in connection with refunds, rebates, credits, or other amounts due (including any interest thereon) in executing any protest, pleading, application, power of attorney, or other papers in connection therewith.

§ 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 and 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 which are legally required at the time bids are received or negotiations concluded.

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

§ 3.7.3 If the Contractor observes that portions of the Contract Documents are at variance with, laws, statutes, ordinances, codes, and rules and regulations, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

§ 3.7.3.1 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 in writing, 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 in sufficient time to avoid delay in the Work.

§ 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. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case. The Contractor shall submit the name of the proposed Superintendent together with a resume of his or her experience to the Architect for approval before commencing Work. The Contractor will not commence Work at the site until the Superintendent has been approved.

§ 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 during the progress of the Project without first obtaining the written authorization of both the Owner and the Architect.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall 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, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor, 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.

§ 3.10.4 The Contractor shall furnish such manpower, materials, facilities, and equipment and shall work such hours, including night shifts, overtime operations, Sundays, and holidays as may be necessary to ensure the prosecution and completion of the work in accordance with the Contract time and the approved and currently updated construction schedule. If the Contractor's work on the critical path is 14 days or more behind the currently updated and approved construction schedule and it becomes apparent from the schedule that the work will not be completed within the Contract time, the Contractor shall take some or all of the following actions at no additional cost to the Owner to improve the Contractor's progress using the following sequence of events.

- .1 Reschedule activities to achieve maximum practical concurrence of the accomplishment of activities. The Contractor shall submit a schedule demonstrating Contractor's program and proposed plan to make up the lag in schedule progress and to ensure completion of work within the Contract time.
- .2 If the above cannot be achieved, then:
 - .1 The Contractor shall increase manpower in such quantities and crafts as will substantially eliminate the backlog of work; or
 - .2 Increase the number of working hours, shifts per working day, working days per week, or the amount of equipment or any combination of the foregoing sufficient to substantially eliminate the backlog of work.

§ 3.10.5 The Contractor hereby acknowledges that time is of the essence for performance under this Contract unless otherwise agreed to in writing by the Parties.

§ 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.

§ 3.11.1 Immediately upon receipt of Contract Documents, the Contractor shall identify one each of the documents with the title, "RECORD DOCUMENTS—JOB SET," and update the record set with all Addenda items.

§ 3.11.2 Through progress of the work, the Contractor shall maintain an accurate record of changes in the Contract Documents, as described below. Upon completion of the work, the Contractor will transfer the recorded change to a set of record documents.

§ 3.11.3 The Contractor must record changes that are major concealed items from what is called for by the Contract Documents. This includes such items as main pipes and conduit or changed structural members, which cannot be observed on completion even with the use of access doors or removable panels.

§ 3.11.4 The Contractor must coordinate changes within the record documents, making adequate and proper entries on the specifications, drawings, and other documents where any such entry is required to show the change properly.

§ 3.11.5 The accuracy of records shall be such that future searches for items shown in the Contract Documents may reasonably rely on information obtained for the approved project record documents.

§ 3.11.6 The Contractor must make entries within 24 hours of receipt of information that the change has occurred. Prior to submitting request for final payment, the Contractor must submit the final project record documents to the Architect and secure the Architect's approval. The Contractor must also maintain the job set of record documents completely protected from loss and damage.

§ 3.11.7 The Contractor shall submit the completed set of project record documents to the Architect.

§ 3.11.8 The Contractor must participate in review meetings as required.

§ 3.11.9 The Contractor must make required changes and promptly deliver the final project record documents to the Architect.

§ 3.11.10 The Architect will review for completeness of record documents. The purpose of the final project record documents is to provide factual information regarding all aspects of the work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site investigation, measurement, and examination.

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate 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. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

§ 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, accuracy, and completeness of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor 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.

§ 3.13.2 The Contractor shall hold and save the Owner, its officers, employees, and agents free and harmless from liability of any nature occasioned by the Contractor's operations on the site.

§ 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, the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials, excessive dust, 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 access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for 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 The Contractor agrees to defend, indemnify, and hold harmless the Owner the state of North Dakota, it's agencies, officers and employees (State), from and against claims, resulting from the performance of the Contractor or it's agent including all costs, expenses, and attorneys' fees, which may in any manner result from or arise out of this Contract, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease, death, or to injury to or destruction of tangible property (other than the destruction of tangible property required by the Contract), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. The legal defense provided by Contractor to the Owner under this provision must be free of any conflicts of interest, even if retention of separate legal counsel for the Owner is necessary. Any attorney appointed to represent the Owner must first qualify as and be appointed by the North Dakota Attorney General as a Special Assistant Attorney General as required under N.D.C.C. § 54-12-08. Contractor also agrees to reimburse the Owner for all costs, expenses and attorneys' fees incurred in establishing and litigating the indemnification coverage provided herein. This obligation shall continue after the termination of this Contract.

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

compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity lawfully licensed to practice architecture, retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative. The term Architect/Engineer, or Engineer, when used in the Contract Documents, means Architect as defined here.

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

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

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the final Payment is due, and with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Section 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract Documents.

§ 4.2.2 The Architect, as the Owner's representative, 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, to endeavor to guard the Owner against defects and deficiencies in the Work, and to determine in general if the Work 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, except as provided in Section 3.3.

§ 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

Facilitating Contract Administration.

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. 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 as to cause no delay in the Work or in the activities of the Owner, Contractor, or Separate Contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may 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 Architect 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. If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.

§ 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 or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of 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 will 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.

§ 5.4 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.

§ 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.

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 or other construction or operations on the site with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract identical or 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 , reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, 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. For purposes of this paragraph only, costs are defined as: reasonable claims by subcontractors, material and equipment suppliers; project managers, project engineers, and project superintendents costs; subcontractor bonding costs; travel; subsistence; lodging; testing services; field office; temporary toilets; temporary wash facilities; temporary drinking water; temporary barricades; temporary fence; temporary phone; temporary water service; temporary gas service; temporary electrical; building heat; fire protection; temporary air circulation; temporary security; temporary enclosures; cleaning; debris disposal; dewatering; and tools. Specifically excluded from costs or damages that the Contractor may recover under this paragraph are profit and overhead.

§ 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.

§ 7.1.4 When either or both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be calculated on basis of the net amount of cost or credit.

- .1 The allowance for overhead and profit combined, included in the total cost shall be based on the following schedule:
 - .1 For the Contractor; for added work performed by the Contractor's own forces, 10 percent of the cost; for deleted work performed by the Contractor's own forces, 5 percent of the cost.
 - .2 For the Contractor; for added or deleted work performed by the Contractor's Subcontractor, 5 percent of the cost due the Subcontractor.
 - .3 For each Subcontractor or Sub-subcontractor involved; for added work performed by the Subcontractor's own forces; 10 percent of the cost; for deleted work performed by the Subcontractor's own forces; 5 percent of the cost.
 - .4 For each Subcontractor; for added or deleted work performed by the Subcontractor's Sub-subcontractor, 5 percent of the amount due the subcontractor.
 - .5 The Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.4.

- .2 In order to facilitate the checking of quotations for extras or credit, all proposals, except those so minor that their propriety can be seen by inspection, shall be accomplished by a complete itemization of costs including labor, materials, and subcontracts. Labor and materials shall be itemized in the manner described above. Where major cost items are subcontracted, they shall be itemized also.
- .3 In no case will a change involving over \$100.00 be approved without such itemization.

§ 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 Methods used in determining adjustments to the Contract Sum may include those listed in Section 7.3.3.

§ 7.2.3 Neither the Owner nor the Architect is responsible to give notice of Change Orders or Construction Change Directives to the surety (if any).

§ 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 method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .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 Additional 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, amounts not in dispute for Work completed under the Construction Change Directive may be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of those costs. For any portion of the cost that remains in dispute, 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. The Contractor shall carry out such written orders promptly. 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, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (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, adverse weather conditions documented in accordance with Section 15.1.6.2; (4) by unusual delay authorized by the Owner; or (5) by other causes that the Contractor asserts, and the Architect determines, may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 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 in a proposed Change Order or Construction Change Directive 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.

§ 9.1.3 The Owner will not make any advance payments before performance by Contractor under this Contract.

§ 9.2 Schedule of Values

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, as 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, 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 to a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

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

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall 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.

§ 9.4 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;
- .8 payments to the Contractor will not be made until all insurance certificates and endorsements required by the Contract Documents are submitted to the Owner.

§ 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.

§ 9.6 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 promptly 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 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.

§ 9.6.9 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of ten (10) percent of each progress payment until such time that the total of all progress payments equals fifty (50) percent of the entire Contract Sum, at which time no additional retainage is held as pursuant to NDCC § 48-01.2-13. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201-2017.

§ 9.6.10 Application for payment shall be prepared by the Contractor, using AIA Documents G702-1992 and G703-1992. Applications shall generally cover work progress for not less than the preceding thirty (30) day period. Applications shall be supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, and shall reflect the required retainage amount.

§ 9.6.11 The Architect will evaluate the Contractor's application for payment within the limits described by article 9, and issue to the Owner a certificate for payment for amounts properly due using AIA document G702-1992.

§ 9.6.12 Payment by the Owner shall be made no later than thirty (30) days after all work covered by the application for payment, as certified by the Architect, is approved as payable by the Owner's Representative, and the applications for payment and any required supporting data have been reviewed and found to be completed properly, and acceptably and the amount representative of the work completed and material suitably stored to the end of the period covered by this application.

§ 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 fourteen days after the date established in the Contract Documents, the amount certified by the Architect or awarded by arbitration, then the Contractor may, upon fourteen 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 shut-down, 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 as required under Section 11.3 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, and Contractor's release or waiver of liens (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (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) Contractor Certification of Non-Asbestos and Lead Free Materials, and (7) 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. Additional items required by Owner to be submitted by Contractor prior to final payment as a minimum are enumerated as follows:

- .1 current Statement of ND Tax Commissioner relating to income tax and sales tax clearance;
- .2 current Certificate of Premium Payment to Workforce Safety & Insurance.

§ 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; or
- .4 audits performed by the Owner, after final payment.

§ 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.

§ 9.10.6 Final retainage shall not be reduced or released until more than thirty (30) days has elapsed from the time of completion and final acceptance of all work by the Architect and the Owner. If at the end of the thirty (30) day period claims are on file as provided, the Owner shall continue to retain from the unpaid funds a sum equal to double the total amount of all claims on file. The remaining balance of the unpaid fund, or if no claims are on file, the entire unpaid fund, shall be released and paid to the Contractor at that time.

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

§ 10.2.2 The Contractor shall keep informed of and comply with, and give notices required by all federal, state, and local laws, statutes, ordinances, codes, rules, regulations, lawful orders of public authorities, and other legal requirements governing the safety, health, and sanitation of persons or property or their protection from damage, injury, or loss, and performance of the Contract Documents in general.

§ 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. In addition, the Contractor shall provide, inspect and maintain all safeguards, safety devices, protective equipment, safety programs and other needed actions the Contractor determines necessary to reasonably protect the life, health and property of the Contractor, subcontractors, the Owner, the public and each of the employees, officers, assigns and agents of the Contractor, subcontractors and the Owner, in connection with the performance of work resulting from or arising out of the Contract Documents.

§ 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 load or 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.

§ 10.2.9 The Contractor shall submit to the Owner a copy of the written safety program to be used as guidelines and direction for the Contractor's and subcontractors' activities. This program must meet all federal, state and local laws, regulations and other legal requirements and include the following minimum provisions: (1) a worksite safety policy and mission statement; (2) assigned responsibilities among management, supervisors and employees; (3) a system for periodic self-inspections, including inspections of job sites, materials, work performance and equipment; (4) a thorough accident and injury reporting and investigation process; (5) a safety orientation program including first aid, medical attention, emergency facilities, fire protection and prevention, housekeeping, illumination, sanitation, personal protective equipment, and occupational noise exposure; and (6) a safety training program including safety "tool box" meetings and other systems for ongoing training and also including training for employees on the recognition, avoidance and prevention of unsafe conditions.

§ 10.2.9.1 It will be a condition of the Contract and shall be made a condition of each subcontract entered into pursuant to that Contract, that the Owner is assuming no liability relating to its receipt and review of the Contractor's safety plan or activities. Safety remains the responsibility of the Contractor. Furthermore, the right of the Owner to receive and review the safety plan or activities 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.

§ 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, lead-containing materials, 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 in writing of the condition.

§ 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 shut-down, delay, and start-up.

§ 10.3.3 The Owner's liability for claims, damages, losses, and expenses of Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them 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, shall be determined by Chapter 32-12.2 of the North Dakota Century Code and subject to the conditions and limitations contained therein.

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

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of 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 secure and keep in force during the term of this Contract and Contractor shall require all subcontractors, prior to commencement of an agreement between Contractor and the subcontractor, to secure and keep in force during the term of this Contract, from an insurance company or insurance companies, government self-insurance pools or government self-retention funds, authorized to do business in North Dakota the following insurance coverages:

- .1 Commercial General Liability, including premises or operations, contractual, and products or completed operations coverage (if applicable) with minimum liability limits of Two Million Dollars and Zero Cents (\$2,000,000) per occurrence.
- .2 Automobile Liability including Owned (if any), Hired, and Non-owned automobiles, with minimum liability limits of Five Hundred Thousand Dollars and Zero Cents (\$ 500,000) per person and Two Million Dollars and Zero Cents (\$2,000,000) per occurrence.
- .3 Workers' Compensation coverage meeting all statutory requirements. The policy shall provide coverage for all states of operation that apply to the performance of this Contract.
- .4 Employers' Liability or "stop gap" insurance of not less than Two Million Dollars and Zero Cents (\$2,000,000) as an endorsement on the workers' compensation or commercial general liability insurance.

§ 11.1.2 Additional Insured Obligations. The insurance coverages listed in this Section 11 must meet the following additional requirements:

§ 11.1.2.1 Any deductible or self-insured retention amount or other similar obligation under the policies shall be the sole responsibility of the Contractor. The amount of any deductible or self retention is subject to approval by Owner.

§ 11.1.2.2 This insurance may be in policy or policies of insurance, primary and excess, including the so-called umbrella or catastrophe form and must be placed with insurers rated "A-" or better by A.M. Best Company, Inc., provided any excess policy follows form for coverage. Less than an "A-" rating must be approved by Owner. The policies shall be in form and terms approved by the Owner.

§ 11.1.2.3 The Owner will be defended, indemnified, and held harmless to the full extent of any coverage actually secured by the Contractor in excess of the minimum requirements set forth in this Section 11.1. The duty to indemnify the Owner under this Contract shall not be limited by the insurance required in this contract.

§ 11.1.2.4 The Owner, the state of North Dakota and its agencies, officers, and employees (State) shall be endorsed on the commercial general liability policy and automobile policy on a primary and noncontributory basis, including any excess policies (to the extent applicable), as additional insured. The Owner shall have all the benefits, rights and coverages of an additional insured under these policies that shall not be limited to the minimum limits of insurance required by this Contract or by the contractual indemnity obligations of the Contractor. The additional Insured endorsement for the commercial general liability policy and automobile policy shall be written on a form equivalent to the ISO 1985 CG 20 10 11 85-form, e.g., ISO CG 20 10 04 13 and CG 20 37 04 13 purchased together, and for the automobile policy form CA 20 48 10 13 or their equivalents as approved by the Owner; and shall not limit or delete Owner's coverage in any way based upon Owner's acts or omissions.

§ 11.1.2.5 The insurance required in this Contract, through a policy or endorsement, shall include:

- .1 a "Waiver of Subrogation" waiving any right to recovery the insurance company may have against the Owner, written on forms CG 24 04 05 14 and CA 04 44 03 10 13 or their equivalents;
- .2 a provision that Contractor's insurance coverage shall be primary (i.e., pay first) as respects any insurance, self-insurance or self-retention maintained by the State and that any insurance, self-insurance or self-retention maintained by the State shall be in excess of the Contractor's insurance and shall not contribute with it;
- .3 cross liability/severability of interest for all policies and endorsements;
- .4 The legal defense provided to the Owner under the policy and any endorsements must be free of any conflicts of interest, even if retention of separate legal counsel for the Owner is necessary;

- .5 The insolvency or bankruptcy of the insured Contractor shall not release the insurer from payment under the policy, even when such insolvency or bankruptcy prevents the insured Contractor from meeting the retention limit under the policy.

§ 11.1.2.6 The Contractor shall furnish a certificate of insurance to the Owner's Representative that evidence compliance with the requirements in this Section 11.1 prior to commencement of this Contract. All endorsements shall be provided as soon as practicable. The Certificates shall be ACORD Certificate of Insurance 25.

§ 11.1.2.7 Failure to provide insurance as required in this Contract is a material breach of the Contract entitling Owner to terminate this Contract immediately.

§ 11.1.2.8 Contractor shall provide at least 30-day notice of any cancellation or material change to the policies or endorsements. Contractor shall provide on an ongoing basis, current certificates of insurance during the term of the Contract. A renewal certificate will be provided 10 days prior to coverage expiration.

§ 11.1.2.9 The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the state of North Dakota, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.1 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors, and Sub-subcontractors in the Project as additional insureds.

§ 11.1.2.10 Property insurance shall be all Builder's Risk insuring the interest of the Owner, contractor(s) and subcontractor(s) of all tiers including coverage on an All Risk basis, including but not limited to, coverage against fire, lightning, wind damage, hail, explosion, riot or civil commotions, aircraft and other vehicles, collapse, flood, earth movement, and coverage available under the so-called Installation Floater. The policy(ies) for such coverage shall be secured and maintained by Contractor in an amount equal to the Full Completed Value of the project. Any deductible amount under the policy(ies) shall be the sole responsibility of the Contractor.

§ 11.1.2.11 The General Contractor's bid shall include the builder's risk premium on an amount equal to 100 percent of the Architect's estimated project cost, including the Architect's fee.

§ 11.1.2.12 Builder's Risk insurance shall remain in effect until the building or project reaches substantial completion or otherwise agreed by the Owner and Contractor.

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

§ 11.1.3 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by N.D.C.C. 48-01.2-10. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the State of North Dakota. The required performance and payment bonds shall be prepared using AIA Documents A312 2010 Performance Bond and A312 2010 Payment Bond modified as follows (modification in italics):

A312 Performance Bond

Section 3.1 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 *may* attend. Unless the Owner agrees otherwise, any conference

requested under this Section 3.1 shall be held within *forty-eight (48) hours* of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed *no more than twelve (12) additional days* to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

Section 15 *Performance of the Construction Contract includes payment of all bills or claims on account of labor and materials, including supplies used for machinery and motor power equipment, performed, furnished, and used in and about the performance of said contract, including all demands of subcontractors, and shall make full and true reporting to the North Dakota Worker's Compensation Bureau and Unemployment Compensation Division of the payroll expenditures for the employees to be engaged in such work prior to commencement of any work by himself or itself, or any subcontractor under such contract, and he, or it, has paid, or will pay the premium thereon if prior to commencement of such work, and he, or it, will pay or cause to be paid all sales and use taxes payable as a result of such contract, including use taxes due from any subcontractor under the above named Principal, and shall pay all motor vehicle fees required for commercial vehicles used in connection with the performance of said contract, and shall pay to the State of North Dakota all state income taxes upon income derived or to become due from such work or project, and shall fully indemnify and save harmless the Owner from all cost or damage which it shall suffer by reason of failure to do so, and shall reimburse and repay the Owner for all outlay and expense which the Owner may incur in making good any default and shall promptly make payment, including interest of the amount authorized under Section 13-01-14, N.D.C.C., on bills and claims not paid within 90 days, to all persons, firms, subcontractors, and corporations, furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, whether by subcontractor or otherwise*

A312 Payment Bond

Section 2 *With Respect to Claimants*, 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.

Section 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 *information* of such claims, demands, liens or suits to the Contractor and the Surety.

Section 17 *Performance of the Construction Contract includes payment of all bills or claims on account of labor and materials, including supplies used for machinery and motor power equipment, performed, furnished, and used in and about the performance of said contract, including all demands of subcontractors, and shall make full and true reporting to the North Dakota Worker's Compensation Bureau and Unemployment Compensation Division of the payroll expenditures for the employees to be engaged in such work prior to commencement of any work by himself or itself, or any subcontractor under such contract, and he, or it, has paid, or will pay the premium thereon prior to commencement of such work, and he, or it, will pay or cause to be paid all sales and use taxes payable as a result of such contract, including use taxes due from any subcontractor under the above named Principal, and shall pay all motor vehicle fees required for commercial vehicles used in connection with performance of said contract, and shall fully indemnify and save harmless the Owner from all cost or damage which shall suffer by reason of failure to do so, and shall reimburse and repay the Owner for all outlay and expense which the Owner may incur in making good any default and shall promptly make payment including interest of the amount authorized under Section 13-01-14, N.D.C.C., on bills and claims not paid within 90 days, to all persons, firms, subcontractors, and corporations, furnishing materials for or performing labor in the prosecution of the work provided for in such contract, and any authorized extension or modification thereof, including all amounts due for repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work, whether by subcontractor or otherwise.*

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

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. The Contractor shall provide at least 30-day written notice to the Owner of any cancellation or material change to the policies or endorsements. Contractor shall provide on an ongoing basis, current certificates of insurance during the term of the Contract. A renewal certificate will be provided 10 days prior to coverage 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 the Owner's usual liability insurance.

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

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

§ 11.4 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 unless such loss is caused by the Contractor, its subcontractors, or the agents or employees of any of them however caused.

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 required 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 which 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 or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 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 which the Contractor might have 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

This Contract is governed by and construed in accordance with the laws of the state of North Dakota. Any action to enforce this Contract must be adjudicated exclusively in the North Dakota District Court having jurisdiction where the project is located. Each party consents to the exclusive jurisdiction of such court and waives any claim of lack of jurisdiction or forum non conveniens.

§ 13.1.1 In the event a lawsuit is instituted on behalf of the Owner to obtain performance due of any kind under this Contract, and Owner is the prevailing party, the Contractor shall, except when prohibited by N.D.C.C. § 28-26-04, pay Owner's reasonable attorney fees and costs in connection with the lawsuit.

§ 13.1.2 All Construction under this Contract shall conform to the requirements of the North Dakota State Building Code. The provisions of the North Dakota State Building Code will be strictly adhered to and will take precedence over local governmental body's regulations. Work not regulated by the North Dakota State Building Code shall be performed in accordance with applicable local regulations.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their agents, successors, assigns, and legal representatives to the other party hereto and to agents, successors, assigns, and legal representatives of such other party in respect 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 an institutional lender providing construction financing for the Project. In such event, the lender shall assume the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.2.3 The Contractor may not assign or otherwise transfer or delegate any right or duty without the express written consent of Owner. Provided however, that Contractor may assign its rights and obligations hereunder in the event of a change of control or sale of all or substantially all of its assets related to this Contract, whether by merger, reorganization, operation of law, or otherwise. Should Assignee be a business or entity with whom Owner is prohibited from conducting business, Owner shall have the right to terminate in accordance with the Termination for Cause section of this Contract. Contractor may enter subcontracts provided that any such subcontract acknowledges the binding nature of this Contract and incorporates this Contract, including any attachments. Contractor agrees to be solely responsible for the performance of any subcontractor. Contractor shall not have the authority to contract for or incur obligations on behalf of the Owner.

§ 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 required by the Contract Documents or by laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction shall be made at an appropriate time. 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 which do not become requirements until after bids are received or negotiations concluded.

§ 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 as per N.D.C.C. 48-01.2-14 statutory limits on interest charged to the state of North Dakota.

§ 13.6 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice. The provisions of this section do not supersede any statutes or rules of court regarding notice of claims or service of process. In the event of a conflict between this section and any statutes or rules of court, the statutes or rules of court govern.

§ 13.7 Commencement Of Statutory Limitation Period

§ 13.7.1 As between the Owner and Contractor:

- .1 Before Substantial Completion. As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;
- .2 Between Substantial Completion and Final Certificate for Payment. As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
- .3 After Final Certificate for Payment. As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any Warranty provided under Section 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Section 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

§ 13.8 Equal Opportunity

§ 13.8.1 The Contractor shall maintain policies of employment as follows:

- .1 The Contractor agrees to comply with all applicable laws and rules, including, but not limited to, those relating to nondiscrimination, accessibility, and civil rights. Contractor will timely file all required reports, make all payroll deductions, and timely pay all taxes and premiums owed, including, but not limited to sales and use taxes, unemployment compensation, and workers' compensation premiums. Pursuant to N.D.C.C. 43-07-11.1, Contractor must file a certificate from and by the tax commissioner showing all applicable taxes have been paid. Contractor shall have, and keep current, all required licenses and permits required by law during the term of this Contract. Contractor's failure to comply with this section may be deemed a material breach by Contractor entitling Owner to terminate in accordance with the Termination for Cause section of this Contract.
- .2 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, color, sex, religion, veteran's status, sexual orientation, gender identity, genetic information, political belief or affiliation, age, the presence of any mental or physical disability, status with respect to marriage, status with respect to public assistance, or national

origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, color, sex, religion, veteran's status, sexual orientation, age, genetic information, gender identity, the presence of any mental or physical disability, status with respect of marriage, status with respect to public assistance, political belief or affiliation, or national origin. Such actions 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.

3. 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 applicants will receive consideration for employment without regard to race, color, sex, religion, veteran's status, sexual orientation, age, the presence of any mental or physical disability, status with respect to marriage, status with respect to public assistance, or national origin.

§ 13.8.2 The Contractor is prohibited from boycotting Israel for the duration of this Contract. (See N.D.C.C § 54-44.4-15.) The Contractor represents that it does not and will not engage in a boycotting Israel during the term of this Contract. If the Owner receives evidence that the Contractor boycotts Israel, the Owner shall determine whether the company boycotts Israel. The foregoing does not apply to contracts with a total value of less than \$100,000 or if Contractor has fewer than ten (10) full-time employees. CONTRACTOR's failure to comply with this section may be deemed a material breach by CONTRACTOR entitling STATE to terminate in accordance with the Termination for Cause section of this Contract.

§ 13.9 Hazardous Materials

§ 13.9.1 The use of Asbestos Construction Building Materials (ACBM) is specifically prohibited. The Contractor, supplier, and subcontractor shall warrant that all products used are asbestos free. In the event that a specified product contains asbestos, it shall be the responsibility of the Contractor to notify the Owner so that an appropriate substitution can be made in a timely manner so as not to delay the project.

§ 13.9.2 The Contractor shall provide the Owner with a certificate that warrants that no materials, products, items, or equipment contain any asbestos upon completion of the work of this Contract. If asbestos is found to exist in any of the materials, products, items, or equipment provided as part of this Contract, the Contractor shall be financially responsible for all costs resulting from removal in accordance with an Owner approved method and replacement of an asbestos free conditions to finished drawings and specifications. The financial responsibility of the Contractor shall not terminate with the end of the one year correction of work period, but shall continue through the life of the facility.

§ 13.10 Hazardous Chemicals Risks Right-To-Know

§ 13.10.1 Owner's Responsibility

Owner shall provide to the Contractor a list of known hazardous chemicals within the project site to which their employees may be exposed and suggestions for appropriate protective measures.

§ 13.10.2 Contractor's Responsibility

The Contractor shall provide to the Owner a list of known hazardous chemicals that they anticipate will be used on site as well as all pertinent information relating to employee protection.

§ 13.11 Spoliation

§ 13.11.1 The Contractor shall promptly notify the Owner of all potential claims that arise from or result from this Contract. Contractor shall also take all reasonable steps to preserve all physical evidence and information that may be relevant to the circumstances surrounding a potential claim, while maintaining public safety, and grants to the Owner the opportunity to review and inspect the evidence, including the scene of an accident.

§ 13.12 Confidentiality and Public Records

§ 13.12.1 Contractor agrees not to use or disclose any information it receives from the Owner under this Contract that Owner has previously identified as confidential or exempt from mandatory public disclosure except as necessary to carry out the purposes of this Contract or as authorized in advance by Owner. Owner agrees not to disclose any information it receives from Contractor that Contractor has previously identified as confidential and which Owner determines in its sole discretion is protected from mandatory public disclosure under a specific exception to the North Dakota open records law, N.D.C.C. 44-04. The duty of Owner and Contractor to maintain confidentiality of information under this section continues beyond the term of this Contract, or any extensions or renewals or it. Under the North Dakota public records law, and subject to the Confidentiality clause of this Contract, certain records may be open to the public upon request. Public records may include records the Owner receives from the Contractor under this Contract, records obtained by either party under this Contract and records generated by either party under this Contract. The Contractor agrees to contact the Owner immediately upon receiving a request for information under the public records law and to comply with the State's instructions on how to respond to such request.

§ 13.13 State Audit

§ 13.13.1 Pursuant to N.D.C.C. 54-10-19, all records, regardless of physical form, and the accounting practices and procedures of the Contractor relevant to this Contract are subject to examination by the North Dakota State Auditor, the Auditor's designee, or Federal auditors, if required. The Contractor shall maintain all records for at least three (3) years following completion of this Contract and be able to provide them at any reasonable time. The Owner, State Auditor, or Auditor's designee shall provide reasonable notice to the Contractor prior to conducting examination.

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, profit, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work under contract with the Contractor because the Owner has persistently 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 this Contract effective upon delivery of written notice to

Contractor, or any later date stated in the notice 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 laws, ordinances, or rules, regulations, or orders of a public authority having jurisdiction;
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents;
- .5 refuses or fails to prosecute the work or any separable part thereof with such diligence as will ensure the substantial completion of the work within the Contract time. The right of the Contractor to proceed shall not be so terminated because of delays in the completion of work due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor or the Contractor's Subcontractors.

§ 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 Take possession of the site and 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 and any extensions or renewals of it.

§ 14.2.5 The rights and remedies of Owner provided in this Section 14.2 are not exclusive and are in addition to any other rights and remedies provided by law or under this 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; and costs incurred by reason of the termination.

§ 14.5 Public Contract Termination Upon Notification

§ 14.5.1 Provisions of law which pertain to termination of contracts for construction of public improvements when construction work or work thereon is stopped because of a National Emergency, shall apply to and become a part of this Contract and shall be binding upon all parties hereto, including subcontractors and sureties upon any bond given for filed in connection herewith.

§ 14.5.2 Notwithstanding any other provisions of this Contract, the Owner may terminate this Contract effective on delivery of written notice to the Contractor, or on any later date stated in the notice, if funding from federal, state, or other sources is not obtained and continued at levels sufficient to allow for the purchase of the commodities or services provided for in the Contract Documents, if federal or state laws or rules are modified or interpreted in a way that the services or commodities are no longer allowable or appropriate for purchase under this Contract or no longer eligible for the funding proposed for payment of this Contract, or if any license, permit, or certificate required by law or rule, or the terms of the Contract Documents is for any reason denied, revoked, suspended, or not renewed. If an appropriation to cover the costs of this Contract becomes available within sixty (60) days subsequent to termination under this clause, the Owner agrees to re-enter a Contract with the terminated Contractor under the same provisions, terms, and conditions as the original award.

§ 14.5.3 Any such termination of this Contract shall be without prejudice to any obligation or liabilities of either party already accrued prior to such termination.

§ 14.6 Termination by Mutual Agreement

§ 14.6.1 This Contract may be terminated by mutual consent of both Parties executed in writing.

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, adjustment, or interpretation of Contract terms, payment of money, an extension of 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. Claims must be initiated by written notice. 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 General and 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 laws of the state of North Dakota. The Owner does not agree to any form of binding arbitration, mediation, or other forms of mandatory alternative dispute resolution. The parties have the right to legal action to enforce available remedies. The Owner does not waive any right to a jury trial. If the parties desire to utilize any other method of dispute resolution prior to litigation, they must agree to the same in writing. Claims by either party must be initiated within twenty-one (21) days after occurrence of the event giving rise to such Claim or within twenty-one (21) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be initiated by written notice to the Architect and the other party.

§ 15.1.2.1 Force Majeure. Neither Party will be held responsible for delay or default caused by fire, riot, terrorism, pandemic, acts of God, executive orders issued by the governor or U.S. President, or war if the event was not

foreseeable through the exercise of reasonable diligence by the affected Party, the event is beyond the Party's reasonable control, and the affected Party gives notice to the other Party promptly upon occurrence of the event causing the delay or default or that is reasonably expected to cause a delay or default. If Contractor is the affected Party and does not resume performance within fifteen (15) days or another period agreed between the Parties, the State may seek all available remedies, up to and including termination of this Contract pursuant to its Termination Section, and State is entitled to a pro-rata refund of any amounts paid for which the full value has not been realized, including amounts paid toward software subscriptions, maintenance, or licenses.

§ 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. Claims by either party under this Section 15.1.3.1 shall be initiated within twenty-one (21) days after occurrence of the event giving rise to such Claim or within twenty-one (21) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 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.

§ 15.1.5.1 If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension, or (7) other reasonable grounds, Claim shall be filed in accordance with this Section 15.

§ 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 Injury or Damage to Person or Property

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

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

§ 15.2 Resolution of Claims and Disputes

§ 15.2.1 Decision of the Architect. Claims, including those alleging an error or omission by the Architect but excluding those arising under Sections 10.3, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker. An initial decision by the Architect shall be required as a condition precedent to mediation, arbitration, or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker, without a decision having been rendered by the Initial Decision Maker in which case the claim shall be considered rejected. 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 approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Initial Decision Maker shall be final and binding on the parties but subject to mediation, arbitration, or litigation.

§ 15.2.6 When a written decision of the Initial Decision Maker states that (1) the decision is final but subject to mediation, arbitration, or litigation and (2) that a request for mediation or arbitration of a Claim covered by such decision must be made within thirty (30) days after the date on which the party making the demand receives the final written decision, then failure to request mediation or arbitration within said thirty (30) days' period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor, subject only to litigation of the Claim. If the Initial Decision Maker renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

§ 15.2.7 Upon receipt of a Claim against the Contractor or at any time thereafter, the Architect or 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 Architect or 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 prior to resolution of the Claim by the Initial Decision Maker, by mediation, arbitration, or through litigation.

§ 15.3 Mediation

§ 15.3.1 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 9.10.4, and 9.10.5, may, upon the agreement of both parties and after the initial decision by the Initial Decision Maker or thirty (30) days after submission of the Claim to the Initial Decision Maker if the Initial Decision Maker has not made a decision, be mediated prior to arbitration or the institution of legal or equitable proceedings by either party. The agreement to mediate must be made within thirty (30) days of the date that the request to mediate is made by the party bringing the Claim. If there is no agreement to mediate within the thirty (30) days, the Claim will proceed without mediation.

§ 15.3.2 If the parties agree to mediate, the mediation shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing, with the other party to the Contract and, if the other party agrees to mediate, with the American Arbitration Association. The request may be made concurrently with the filing of a request for arbitration. In the event the parties agree to mediate, arbitration or legal or equitable proceedings shall be stayed pending the mediation for a period of sixty (60) days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

§ 15.3.3 In the event the parties agree to mediate; they 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 Any Claim arising out of or related to the Contract, except Claims relating to aesthetic effect and except those waived as provided for in Sections 9.10.4 and 9.10.5, may, upon the agreement and after the decision by the Initial Decision Maker or thirty (30) days after submission of the Claim to the Initial Decision Maker if the Initial Decision Maker has not made a decision, be arbitrated. Prior to arbitration, the parties may attempt to resolve disputes by mediation in accordance with the provisions of Section 15.3. The mutual agreement to arbitrate must be made within thirty (30) days of the date the request to arbitrate is made by the party bringing the Claim. If there is no agreement to arbitrate within the thirty (30) days, the Claim will proceed without arbitration.

Claims not resolved by mediation or other means may, upon the mutual agreement of the parties, be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The request for arbitration shall be filed in writing with the other party to the Contract and, if the parties agree to arbitrate, with the American Arbitration Association, with a copy being filed with the Architect.

§ 15.4.1.1 A request for arbitration shall be made within the time limits specified in Sections 15.2.6 and 15.4.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when the institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Section 13.7.

§ 15.4.2 Judgment on Final Award. In the event the parties agree to arbitrate, 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 Claims and Timely Assertion of Claims. The party filing a notice of request for arbitration must assert in the request all Claims then known to that party on which arbitration is permitted to be requested.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Limitation on Consolidation or Joinder. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Architect, Contractor, a Separate Contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Architect, Contractor, or a Separate Contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Contract shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.5 Litigation

15.5.1 If the Claim is not resolved informally and the parties do not agree to mediate or arbitrate, the party bringing the Claim may proceed through litigation.

SECTION 01 1000 - SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: 20262120 MSU Hoffman Auditorium Remodel.
- B. Owner's Name: Minot State University.
- C. Architect's Name: EAPC Architects Engineers.
- D. The Project consists of the remodeling of an existing 2,530 SF auditorium with new fixed seating and fixed tables, new A/V system, and wood ceiling. An alternate for new accessible access for the front of the auditorium..

1.2 CONTRACT DESCRIPTION

- A. Contract Type: Multiple prime contracts, each based on a Stipulated Price as described in Document 00 5000 - Contracting Forms and Supplements.
- B. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5200 - Agreement Form.

1.3 WORK BY OWNER

- A. Owner has awarded a contract for Asbestos Abatement of the existing ceiling which will tentatively commence on January 4 - 15, 2027.

1.4 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Owner intends to occupy the Project upon Substantial Completion.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B. Arrange use of site and premises to allow:
 - 1. Owner occupancy.
 - 2. Work by Others.
 - 3. Work by Owner.

- C. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Existing building spaces may not be used for storage.
- E. Time Restrictions:
 - 1. Limit conduct of especially noisy exterior work to after school hours.
- F. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the building is unoccupied.
 - 2. Prevent accidental disruption of utility services to other facilities.

1.6 CONSTRUCTION WORK SEQUENCE

- A. Construction Demolition: December 21 - 31, 2026. There will need to be coordination between the Contractor and Owner Asbestos Abatement Contractor on demolition schedule.
- B. Owner Asbestos Abatement: Tentatively January 4 - 15, 2027 (Two week duration).
 - 1. Hoffman Auditorium will be closed during Spring Semester 2027 & Summer 2027 (January 11 - July 16, 2027).
- C. Construction Start: December 21, 2027 and runs through July 16, 2027.
- D. Substantial Completion: July 16, 2027.
- E. MSU Fall 2027 Classes begin: August 16, 2027.
- F. Coordinate construction schedule and operations with Owner.

1.7 SPECIFICATION SECTIONS APPLICABLE TO EVERY CONTRACT

- A. Unless otherwise noted, provisions of the sections listed below apply to every contract. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Section 01 2000 - Price and Payment Procedures.
- C. Section 01 2100 - Allowances.
- D. Section 01 2300 - Alternates.
- E. Section 01 2500 - Substitution Procedures.
- F. Section 01 3000 - Administrative Requirements.
- G. Section 01 3216 - Construction Progress Schedule.
- H. Section 01 4000 - Quality Requirements.
- I. Section 01 5000 - Temporary Facilities and Controls.
- J. Section 01 6000 - Product Requirements.

K. Section 01 7000 - Execution and Closeout Requirements.

L. Section 01 7800 - Closeout Submittals.

1.8 CONTRACT NO. ____ - GENERAL CONSTRUCTION

A. Division 01 - General Requirements:

1. Specification sections listed above.

B. Provide all Work except Work specifically assigned to other contractors in this Section.

1.9 MECHANICAL CONSTRUCTION

A. Specification sections listed above as applicable to every contract.

B. Division 22 - Plumbing

C. Division 23 - Heating, Ventilating, and Air Conditioning:

1.10 ELECTRICAL CONSTRUCTION

A. Specification sections listed above as applicable to every contract.

B. Division 26 - Electrical: Every section included in Project Manual.

C. Division 27 - Audio Video Systems

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 1000

SECTION 01 2000 - PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

- A. Section 01 2100 - Allowances: Payment procedures relating to allowances.
- B. Section 01 7800 - Closeout Submittals: Project record documents.

1.3 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- E. Include the amount of Allowances specified in a separate line item.. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- F. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- G. Revise schedule to list approved Change Orders, with each Application For Payment.

1.4 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

- D. Forms filled out by hand will not be accepted.
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- H. Submit one electronic copy of each Application for Payment.
- I. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01 3000.
 - 2. Construction progress schedule, revised and current as specified in Section 01 3000.
- J. When Architect requires substantiating information, submit data justifying dollar amounts in question.

1.5 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 15 days.
- C. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.
- D. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 - 2. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
- E. Substantiation of Costs: Provide full information required for evaluation.
 - 1. Provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.

- c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
 - F. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
 - G. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
 - H. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 - I. Promptly enter changes in Project Record Documents.
- 1.6 APPLICATION FOR FINAL PAYMENT
- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
 - B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01 7000.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2000

SECTION 01 2100 - ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contingency allowance.
- B. Payment and modification procedures relating to allowances.

1.2 RELATED REQUIREMENTS

- A. Section 01 2000 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 CONTINGENCY ALLOWANCE

- A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- B. Contingency Allowance is to be used on;ly for unforeseen expenses during construction and with the Architect's approval.
- C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.4 ALLOWANCES SCHEDULE

- A. Contingency Allowance: Include the stipulated sum/price of \$50,000 for use upon Architect's instructions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2100

SECTION 01 2300 - ALTERNATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description of Alternates.

1.2 RELATED REQUIREMENTS

- A. Document 00 1000 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.
- B. Section 00 3000 - Forms: Bid Form.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of the alternate.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.
- C. Alternates described in this Section are part of the Work only if enumerated in the Agreement.

1.5 SCHEDULE OF ALTERNATES

- A. ADD Alternate No. 01 - New ADA Ramp:
 - 1. Base Bid: No exterior work to be done. Door A104 to remain as existing. Door A101C to have new hardware, see Door Schedule. Corridor A104 to remain as existing.
 - 2. Alternate No. 01: New exterior ADA ramp, as detailed in Civil Drawings C002 & C004. Provide Automatic door operators to existing doors A104 & A101C. Handicapped operators to be wired to existing panel. See Electrical drawings. Door A104 to have card access wired to existing panel. See electrical drawings. New handrails to be added in Corridor 104.

- B. ADD Alternate No. 02 - A/V 4K LED Screen:
 - 1. Base Bid: Provide HD Screen. See AV drawings and specifications.
 - 2. Alternate No. 02: Provide 4K LED Screen. See AV drawings and specifications.
- C. ADD Alternate No. 03 - A/V Enhanced Guest Computer Access:
 - 1. Base Bid: Provide regular computer access at podium. See AV drawings and specifications.
 - 2. Alternate No. 03:

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2300

SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.2 RELATED REQUIREMENTS

- A. Section 01 2100 - Allowances, for cash allowances affecting this section.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

1.3 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor will not be considered.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.

5. Waives claims for additional costs or time extension that may subsequently become apparent.
 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
1. No specific form is required. Contractor's Substitution Request documentation must include the following:
 - a. Project Information:
 - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - 2) Owner's, Architect's, and Contractor's names.
 - 3) _____.
 - b. Substitution Request Information:
 - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - 2) Indication of whether the substitution is for cause or convenience.
 - 3) Issue date.
 - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).
 - 5) Description of Substitution.
 - 6) Reason why the specified item cannot be provided.
 - 7) Differences between proposed substitution and specified item.
 - 8) Description of how proposed substitution affects other parts of work.
 - 9) _____.
 - c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - 1) Physical characteristics.
 - 2) In-service performance.
 - 3) Expected durability.
 - 4) Visual effect.
 - 5) Warranties.
 - 6) Other salient features and requirements.
 - 7) Include, as appropriate or requested, the following types of documentation:
 - a) Product Data:
 - b) Samples.
 - c) Certificates, test, reports or similar qualification data.
 - d) Drawings, when required to show impact on adjacent construction elements.
 - e) _____.
 - d. Impact of Substitution:
 - 1) Savings to Owner for accepting substitution.
 - 2) Change to Contract Time due to accepting substitution.
 - 3) _____.

- D. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:
 - 1. Instructions to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.
 - 2. Owner will consider requests for substitutions only if submitted at least 10 days prior to the date for receipt of bids.
- B. Submittal Form (before award of contract):
 - 1. Submit substitution requests by completing the form attached to section 00 3000. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.3 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):
 - 1. Submit substitution requests by completing the form attached to section 00 3000. See this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- C. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- D. Submit request for Substitution for Convenience within 14 days of discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
 - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 - 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
 - b. Other construction by Owner.
 - c. Other unanticipated project considerations.
- E. Substitutions will not be considered under one or more of the following circumstances:
 - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 - 2. Without a separate written request.
 - 3. When acceptance will require revisions to Contract Documents.

3.4 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.
 - 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.5 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION 01 2500

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Construction progress schedule.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Requests for Interpretation (RFI) procedures.
- H. Submittal procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: General product requirements.
- B. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 REFERENCE STANDARDS

- A. AIA G716 - Request for Information; 2004.

1.4 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.

8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

1.5 PROJECT COORDINATOR

- A. Project Coordinator: The General Contractor is the Project Coordinator.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting after contracts are executed.
- B. Attendance Required:
 1. Owner.
 2. Architect.
 3. Contractor.
 4. _____.
 5. _____.
- C. Agenda:
 1. Distribution of Contract Documents.
 2. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 3. Submission of initial Submittal schedule.
 4. Designation of personnel representing the parties to Contract and Architect.
 5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 6. Scheduling.

- D. Architect will record minutes and distribute copies within 7 days after meeting to participants, and those affected by decisions made.

3.2 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
- B. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Maintenance of progress schedule.
 - 9. Corrective measures to regain projected schedules.
 - 10. Planned progress during succeeding work period.
 - 11. Coordination of projected progress.
 - 12. Maintenance of quality and work standards.
 - 13. Effect of proposed changes on progress schedule and coordination.
 - 14. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.3 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.

- E. Submit updated schedule with each Application for Payment.

3.4 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 - 2. Prepare in a format and with content acceptable to Owner.
 - a. Use AIA G716 - Request for Information .
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 - 1. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 - 2. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 - 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect's, and Contractor's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date, and requested reply date.

5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 3. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.5 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
1. Coordinate with Contractor's construction schedule and schedule of values.
 2. Format schedule to allow tracking of status of submittals throughout duration of construction.
 3. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 4. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
 - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.6 SUBMITTALS FOR REVIEW

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

3.7 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.8 SUBMITTALS FOR PROJECT CLOSEOUT

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

3.9 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

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

3.10 SUBMITTAL PROCEDURES

- A. General Requirements:
 - 1. Use a separate transmittal for each item.
 - 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 - 3. Transmit using approved form, found in section 00 3000.
 - 4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 - 5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 - 6. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Send submittals in electronic format via email to Architect.
 - 7. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
 - 8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 - 9. Provide space for Contractor and Architect review stamps.
 - 10. When revised for resubmission, identify all changes made since previous submission.
 - 11. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 - 12. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 - 13. Submittals not requested will not be recognized or processed.
- B. Product Data Procedures:
 - 1. Submit only information required by individual specification sections.
 - 2. Collect required information into a single submittal.
 - 3. Submit concurrently with related shop drawing submittal.
 - 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 - 2. Do not reproduce Contract Documents to create shop drawings.

3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Provide physical copies of samples.

3.11 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
 1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved", Approved as Noted".
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.

END OF SECTION 01 3000

SECTION 01 3216 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.2 RELATED SECTIONS

- A. Section 01 1000 - Summary: Work sequence.

1.3 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Submit updated schedule with each Application for Payment.
- D. Submit in PDF format.

1.4 QUALITY ASSURANCE

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

1.5 SCHEDULE FORMAT

- A. Sheet Size: Multiples of 8-1/2 x 11 inches.
- B. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Provide sub-schedules for each stage of Work identified in Section 01 1000 - Summary.
- D. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- E. Coordinate content with schedule of values specified in Section 01 2000 - Price and Payment Procedures.
- F. Provide legend for symbols and abbreviations used.

3.3 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.4 DISTRIBUTION OF SCHEDULE

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

END OF SECTION 01 3216

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Contractor's construction-related professional design services.
- F. Contractor's design-related professional design services.
- G. Mock-ups.
- H. Tolerances.
- I. Defect Assessment.

1.2 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 6000 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2023).
- B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2026.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2025.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2023.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2025b.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2026.
- G. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.
- H. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2025.

1.4 DEFINITIONS

- A. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
 - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- B. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.5 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Temporary sheeting, shoring, or supports.
 - 2. Temporary scaffolding.
 - 3. Temporary bracing.
 - 4. Temporary foundation underpinning.
 - 5. Temporary stairs or steps required for construction access only.
 - 6. Investigation of soil conditions to support construction equipment.

1.6 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
 - 1. Submit a Request for Interpretation to Architect if the criteria indicated are not sufficient to perform required design services.
- C. Scope of Contractor's Professional Design Services: Provide for the following items of work:
 - 1. See Drawings and Specifications.

1.7 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.

1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
 - a. Full name.
 - b. Professional licensure information.
 - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
 1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
 2. Include required product data and shop drawings.
 3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 1. Submit report in duplicate within 30 days of observation to Architect for information.

2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- H. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.8 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.9 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.10 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.

- B. Contractor shall employ and pay for services of an independent testing agency to perform specified testing.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. Contractor Employed Agency:
 - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
 - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

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

3.2 MOCK-UPS

- A. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings and specifications. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
- B. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- C. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- D. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

- E. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.3 TOLERANCES

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

3.4 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

- 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.5 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION 01 4000

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

1.3 TEMPORARY UTILITIES

- A. Owner will provide the following:
 - 1. Electrical power and metering, consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.
- B. Existing facilities may not be used.

1.4 TELECOMMUNICATIONS SERVICES

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

1.5 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

1.6 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 FENCING

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

1.8 INTERIOR ENCLOSURES

- A. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:
 - 1. Maximum flame spread rating of 75 in accordance with ASTM E84.
- B. Paint surfaces exposed to view from Owner-occupied areas.

1.9 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Designated existing on-site roads may be used for construction traffic.
- F. Coordinate construction parking areas with the Owner.

1.10 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

- B. Provide containers with lids. Remove trash from site periodically.

1.11 PROJECT IDENTIFICATION

- A. Erect on site at location established by Architect.
- B. Provide project identification sign of design, construction, and location approved by Owner.

1.12 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 5000

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Substitution limitations.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

- A. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.

1.3 SUBMITTALS

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

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 01 4000 - Quality Requirements, for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
 - 1. Containing lead, cadmium, or asbestos.

2.3 PRODUCT OPTIONS

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

2.4 MAINTENANCE MATERIALS

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

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.2 TRANSPORTATION AND HANDLING

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

- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

3.3 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
 - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts.
- F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Do not store products directly on the ground.
- J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- L. Prevent contact with material that may cause corrosion, discoloration, or staining.
- M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION 01 6000

SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Surveying for laying out the work.
- C. Cleaning and protection.
- D. Starting of systems and equipment.
- E. Demonstration and instruction of Owner personnel.
- F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- D. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- E. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.
- F. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- G. Section 01 7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.4 PROJECT CONDITIONS

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

1.5 COORDINATION

- A. See Section 01 1000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

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

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 LAYING OUT THE WORK

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

3.4 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.5 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 - 2. Remove items indicated on drawings.
 - 3. Relocate items indicated on drawings.
 - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, Telecommunications, and _____): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

- a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
- 4. Verify that abandoned services serve only abandoned facilities.
- 5. Remove abandoned pipe, ducts, conduits, and equipment , including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
 - 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 - 3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
 - 4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean existing systems and equipment.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
- M. Comply with all other applicable requirements of this section.

3.6 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.

2. Fit products together to integrate with other work.
 3. Provide openings for penetration of mechanical, electrical, and other services.
 4. Match work that has been cut to adjacent work.
 5. Repair areas adjacent to cuts to required condition.
 6. Repair new work damaged by subsequent work.
 7. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- I. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 2. Match color, texture, and appearance.
 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.7 PROGRESS CLEANING

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

3.8 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.

- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.9 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.

3.10 ADJUSTING

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

3.11 FINAL CLEANING

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

3.12 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Owner will occupy all of the building as specified in Section 01 1000.
- F. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.13 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

END OF SECTION 01 7000

SECTION 01 7800 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Materials transparency manual.
- D. Warranties and bonds.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 3. Field changes of dimension and detail.
 - 4. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

- A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- L. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Photocopies of warranties and bonds.

3.6 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Retain warranties and bonds until time specified for submittal.
- D. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION 01 7800

SECTION 01 7900 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Electrical systems and equipment.
 - 4. Audio Visual Equipment.
 - 5. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Finishes, including flooring, wall finishes, ceiling finishes.
 - 2. Fixtures and fittings.
 - 3. Items specified in individual product Sections.

1.2 RELATED REQUIREMENTS

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

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:
- B. Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit to Architect for transmittal to Owner.
 - 2. Submit not less than four weeks prior to start of training.
 - 3. Revise and resubmit until acceptable.
 - 4. Provide an overall schedule showing all training sessions.
 - 5. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:
 - 1. Identification of each training session, date, time, and duration.
 - 2. Sign-in sheet showing names and job titles of attendees.
 - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.

1.4 QUALITY ASSURANCE

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 DEMONSTRATION - GENERAL

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

3.2 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Owner will provide classroom and seating at no cost to Contractor.
- C. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.
- D. Provide training in minimum two hour segments.
- E. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- F. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 - 3. Typical uses of the O&M manuals.
- G. Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 - 6. Discuss common troubleshooting problems and solutions.
 - 7. Discuss any peculiarities of equipment installation or operation.
 - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 - 10. Review spare parts and tools required to be furnished by Contractor.
 - 11. Review spare parts suppliers and sources and procurement procedures.
- H. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION 01 7900

SECTION 02 4100 - DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Selective demolition of building elements for alteration purposes.

1.2 RELATED REQUIREMENTS

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

1.3 DEFINITIONS

- A. Demolish: Dismantle, raze, destroy, or wreck any building or structure or any part thereof.
- B. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.
- C. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.
- D. Remove and Reinstall: Detach or dismantle items from existing construction in a manner to prevent damage. Clean and prepare for reuse and reinstall where indicated.
- E. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2027.

1.5 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor and shall be disposed of properly.
- 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.

1.6 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.7 PREINSTALLATION MEETINGS

- A. Predemolition 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 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.
 - 6. Review and finalize protection requirements.
 - 7. Review procedures for noise control and dust control.
 - 8. Review storage, protection, and accounting for items to be removed for salvage or reinstallation.

1.8 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 demolition, the Owner will remove the following:
 - a. Minor contents of building spaces, including furniture, office equipment and supplies, and phones, computers, televisions, and other electronic devices.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials:
 - 1. It is not expected that hazardous materials will be encountered in the Work.
 - a. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. If tested and confirmed, such hazardous materials will be removed by Owner under separate Contract.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.1 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of ANSI/ASSP A10.6 and NFPA 241.

3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 4. Provide, erect, and maintain temporary barriers and security devices.
 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 7. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
 8. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
 9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.
- B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs, video, or dimensioned drawings.
1. Inventory and record the condition of items to be removed for salvage or reinstallation. Photograph or video conditions that might be misconstrued as damage caused by removal.
 2. Photograph or video existing conditions of any adjoining construction, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations or removal of items for salvage or reinstallation.
- C. Do not begin removal until receipt of notification to proceed from Owner.
- D. Do not begin removal until built elements to be salvaged or relocated have been removed.
- E. Protect existing structures and other elements to remain in place and not removed.
1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.
- F. Hazardous Materials:
1. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCBs, and mercury.
 - a. Verify that hazardous materials have been remediated before continuing building demolition operations in that area.
- G. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Dismantle existing construction and separate materials.
 2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.2 EXISTING UTILITIES

- A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.
- B. Protect existing utilities to remain from damage.

- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Verify that all appropriate utilities have been disconnected and capped as required before starting selective demolition operations.
- E. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- F. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- G. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- H. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.3 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
 - 1. Verify construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from areas that remain occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000, in locations indicated on drawings.
 - 2. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
- C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.
- D. 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.
- E. Remove existing work as indicated and required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.
 - 2. Remove items indicated on drawings.
- F. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
 - 1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.

2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 3. Verify that abandoned services serve only abandoned facilities before removal.
 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.
- G. Protect existing work to remain.
1. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations. When permitted by Architect or Owner, items may be removed to a suitable, protected storage location and reinstalled in their original locations after selective demolition operations are complete.
 2. Cover and protect furniture, furnishings, and equipment that have not been removed.
 3. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 4. Repair adjacent construction and finishes damaged during removal work.
 5. Patch to match new work.
- H. Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 3. 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.
 4. Maintain fire watch during and for at least 1 hour after flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete:
1. Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
 2. 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 in accordance with recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

3.5 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. 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.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 02 4100

SECTION 05 5213 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall mounted handrails.
- B. Stair railings and guardrails.

1.2 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of anchors in masonry.
- C. Section 09 2116 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. AISC 207 - Standard for Certification Programs; 2025.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- F. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.
- G. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.
- H. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2025, with Amendment (2026).
- J. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- K. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.4 SUBMITTALS

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

- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings.
- C. Designer's Qualification Statement.
- D. Fabricator's Qualification Statement.

1.5 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 207.

PART 2 PRODUCTS

2.1 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set.
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set.
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
 - 2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
 - 3. For anchorage to stud walls, provide backing plates, for bolting anchors.
 - 4. Provide floor anchor plates to run parallel with railings to avoid anchor plates to be a tripping hazard at the chair landings.

- G. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.2 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A53/A53M Grade B Schedule 80, galvanized finish.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- E. Galvanizing: In accordance with requirements of ASTM A123/A123M.
 - 1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.
- F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.3 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
 - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Weld connections that cannot be shop welded due to size limitations.
 - 1. Weld in accordance with AWS D1.1/D1.1M.
 - 2. Match shop welding and bolting.
 - 3. Clean welds, bolted connections, and abraded areas.
 - 4. Touch up shop primer and factory-applied finishes.
 - 5. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION 05 5213

SECTION 06 1053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTIONS INCLUDES

- A. Preservative-treated wood materials.
- B. Fire-retardant-treated wood materials.
- C. Communications and electrical room mounting boards.
- D. Concealed wood blocking, nailers, and supports.

1.2 REFERENCE STANDARDS

- A. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing; 2019a.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- C. AWWA M4 - Standard for the Handling, Storage, Field Fabrication and Field Treatment of Preservative-Treated Wood Products; 2026.
- D. AWWA U1 - Use Category System: User Specification for Treated Wood; 2025.
- E. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. ITS (DIR) - Directory of Listed Products; Current Edition.
- G. PS 1 - Structural Plywood; 2023.
- H. PS 20 - American Softwood Lumber Standard; 2025.
- I. UL (DIR) - Online Certifications Directory; Current Edition.
- J. WPA G-5 - Western Lumber Grading Rules; 2025.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Fire-retardant treatment.

1.4 DELIVERY, STORAGE, AND HANDLING

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

- B. Fire-Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org), and that provides grading service for species and grade specified. Provide lumber stamped with grade mark unless otherwise indicated.

2.2 DIMENSION LUMBER

- A. Grading Agency: Western Wood Products Association; WWPA G-5.
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No.2 or Standard Grade.
 - 2. Boards: Standard or No.3.

2.3 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1, A-D plywood; 3/4 inch thick; fire-retardant treated.
- B. Riser Sheathing: Plywood, PS-1, Grade A-D plywood; 3/4" inch thick; fire-retardant treated.

2.4 FIRE-RETARDANT TREATMENT (FRT)

- A. Factory-treat wood members in accordance with AWWPA U1 and use category indicated.
- B. Fire-Retardant Treatment: Interior Type A, Use Category UCFA (LT), Low-Temperature (low hygroscopic).
 - 1. Treat blocking and other wood members concealed in noncombustible construction.
 - 2. Treat electrical and communications panel backer boards.
- C. Kiln-dry after treatment (KDAT) to maximum moisture content of 19 percent for sawn material and 15 percent for plywood.
- D. Fabrication of FRT Wood:
 - 1. Ripping or milling of boards, lumber, and timber after treatment is not permitted.
 - 2. Field cutting to length and drilling of holes in boards, lumber, and timber are permitted without additional treatment.
 - 3. Field cutting and drilling of holes in plywood are permitted.

- E. Label or brand FRT wood with classification mark of UL (DIR) or ITS (DIR) or other approved inspection agency, the treatment plant, name of treatment, species of wood, flame spread and smoke-developed indexes, method of drying after treatment, and treating standard.

2.5 ACCESSORIES

- A. Metal and Finish of Fasteners:
 - 1. Fire-Retardant-Treated Wood:
 - a. Nails, timber rivets, wood screws, and lag screws: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
 - 2. Untreated Wood: Unfinished steel.
 - 3. Metal and Finish: Hot-dip galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 4. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

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

3.2 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code to close concealed draft openings between floors and between top story and roof and attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items unless item can be securely fastened to two or more studs or another method of support is explicitly indicated.
- E. Where ceiling mounting is indicated, provide blocking and supplementary supports above ceiling unless another method of support is explicitly indicated.
- F. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.

2. Wall brackets.
3. Handrails.
4. Wall-mounted door stops.
5. Chalkboards and marker boards.
6. Wall paneling and trim.

3.3 INSTALLATION OF CONSTRUCTION PANELS

- A. Construction Panels - General: Install in accordance with APA E30.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs; space fasteners at maximum 24 inches on center.
 1. At fire-rated walls, install board over wallboard indicated as part of fire-rated assembly.
 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 3. Install adjacent boards without gaps.

3.4 CLEANING

- A. Do not leave wood, shavings, sawdust, etc. on ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering storm drainage system.

END OF SECTION 06 1053

SECTION 06 2000 - FINISH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Finish carpentry items.
- B. Hardware.
- C. Fire-retardant treatment (FRT).
- D. Shop finishing.

1.2 RELATED REQUIREMENTS

- A. Section 09 9300 - Staining and Transparent Finishing.

1.3 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- C. BHMA A156.9 - Cabinet Hardware; 2020.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units.
 - 2. Provide data on wood treatment.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 - 2. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
 - 3. Include certification program label.

- D. Samples: Submit two samples of stained wood ceiling boards 12 inch long.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- C. Protect from moisture damage.
- D. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS

2.1 FINISH CARPENTRY ITEMS

- A. Interior Woodwork Items:
 - 1. Suspended Wood Ceiling: Fire-retardant treated Category UCFA; suitable for finish indicated in contract documents.

2.2 LUMBER MATERIALS

- A. 2 X 4 Dimensional Lumber: #2 Premium grade, kiln-dried , maximum moisture content of 6 percent, of quality suitable for transparent finish.
 - 1. Grading: In accordance with rules certified by ALSC; www.alsc.org.
 - 2. Provide various lengths: 6'-0", 8'-0", & 10'-0". See sheets A321-A330 for locations.

2.3 SHEET MATERIALS

2.4 FASTENINGS

- A. Fasteners: Of size and type to suit application; _____ finish in concealed locations and _____ finish in exposed locations.

2.5 HARDWARE

- A. Hardware: Comply with BHMA A156.9.
 - 1. 1/8" Galvanized Aircraft Cable.
 - 2. Zinc Plated Turn Buckle Hook/Eye.
 - 3. Zinc Plated Lag Thread Screws.

2.6 FABRICATION

- A. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.7 SHOP FINISHING

- A. Sand work smooth and set exposed nails.
- B. Apply wood filler in exposed nail indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Stain, seal, and varnish exposed to view surfaces. Brush apply only.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Set and secure materials and components in place, plumb and level.

3.3 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

3.4 TOLERANCES

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

END OF SECTION 06 2000

SECTION 06 4100 - ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cabinet and drawer hardware.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

- A. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard size.

1.5 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: Firm specializing in fabricating and installing products specified in this section with minimum five years of documented experience; with qualifications indicating ability to comply with requirements of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

1.7 FIELD CONDITIONS

PART 2 PRODUCTS

2.1 ARCHITECTURAL WOOD CASEWORK

- A. Provide casework and casework components in sizes and profiles as indicated on drawings.

2.2 THERMALLY FUSED LAMINATE PANELS

- A. Description: Thermally Fused Laminate (TFL) panels with one or multiple resin-impregnated sheets of decorative paper thermally fused to panel cores, producing balanced construction.

2.3 CONCEALED CABINET BASE COMPONENTS

- A. Cabinet Base Toe-Kick Subfronts:
- B. Cabinet Base Blocking and Stretchers:
- C. Cabinet Base Sleepers:

2.4 WOOD AND WOOD-BASED MATERIALS

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify casework and materials required for installation have been delivered, handled and stored as specified.
- B. Verify wood blocking that provides casework backing is installed as indicated on drawings.
- C. Verify location and sizes of rough-in plumbing and rough-in electrical associated with work of this section.

3.2 INSTALLATION

- A. Install and secure work of this section in accordance with specified performance requirements.

3.3 ADJUSTING

- A. Adjust hardware for smooth operation in accordance with hardware manufacturer's documented instructions.

3.4 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Clean exposed surfaces of casework, shelving, and hardware.

END OF SECTION 06 4100

SECTION 07 2100 - THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Batt insulation for filling void spaces in risers.
- B. Batt insulation for filling spaces in interior wall construction.

1.2 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Installation requirements for board insulation over auditorium risers.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- D. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2026.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.

2.2 MINERAL FIBER BLANKET INSULATION MATERIALS

- A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
 - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 4. Formaldehyde Content: Zero.
 - 5. Thermal Resistance: R-value as indicated in drawings.
 - 6. Products:

- a. CertainTeed Corporation: www.certainteed.com/#sle.
 - b. Johns Manville: www.jm.com/#sle.
 - c. Knauf Insulation; Performance+ EcoBatt Insulation: www.knaufinsulation.com/#sle.
 - d. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- B. Mineral Wool Blanket Thermal Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.
 - 1. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 2. Thermal Resistance: R-value as indicated in drawings.
 - 3. Products:
 - a. Johns Manville; MinWool Sound Attenuation Fire Batts: www.jm.com/#sle.
 - b. ROCKWOOL: www.rockwool.com/#sle.
 - c. Thermafiber, Inc; SAFB: www.thermafiber.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.3 ACCESSORIES

- A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
 - 1. Application: Sealing of interior circular penetrations, such as pipes or cables.
 - 2. Width: Are required for application.
- B. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- C. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in interior walls and riser floor spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

- F. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over face of member
- G. Tape seal tears or cuts in vapor retarder.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.

3.4 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.
- B. Replace all damaged insulation prior to concealment.

END OF SECTION 07 2100

SECTION 08 1213 - HOLLOW METAL FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated hollow metal frames for non-hollow metal doors.
- B. Fire-rated hollow metal frames for non-hollow metal doors.

1.2 RELATED REQUIREMENTS

- A. Section 08 1416 - Flush Wood Doors: Non-hollow metal door for hollow metal frames.
- B. Section 08 7100 - Door Hardware: Hardware, silencers, and weatherstripping.
- C. Section 09 9123 - Interior Painting: Field painting.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2026.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2024.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2025.
- F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.
- G. ASTM C143/C143M - Standard Test Method for Slump of Concrete; 2026a.
- H. ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- I. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- K. ITS (DIR) - Directory of Listed Products; Current Edition.
- L. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- M. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2024.

- N. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.
- O. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- P. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- Q. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2026.
- R. UL (DIR) - Online Certifications Directory; Current Edition.
- S. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide hollow metal frames from SDI Certified manufacturer: <https://steeldoor.org/sdi-certified/#sle>.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- C. Maintain at project site copies of reference standards relating to installation of products specified.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with applicable requirements and in compliance with standards and/or custom guidelines as indicated.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Frames: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Ceco Door, an Assa Abloy Group company; ____: www.assaabloydss.com/#sle.
 - 2. Curries, an Assa Abloy Group company; ____: www.assaabloydss.com/#sle.
 - 3. The MPI Group, LLC.: www.metalproductsinc.com
 - 4. Steelcraft, an Allegion brand; ____: www.allegion.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Refer to Door and Frame Schedule on drawings for frame sizes, fire ratings, sound ratings, finishing, door hardware to be installed, and other variations, if any.
- B. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
- C. Accessibility: Comply with ICC A117.1 and ADA Standards.
- D. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior frame that is also indicated as being sound-rated must comply with the requirements specified for exterior frames and for sound-rated frames; where two requirements conflict, comply with the most stringent.
- E. Hardware Preparations, Selections and Locations: Comply with BHMA A156.115, NAAMM HMMA 830, NAAMM HMMA 831 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- F. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- G. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into head of frame, and flush with top.
- H. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

2.3 HOLLOW METAL DOOR FRAMES

- A. Frame Finish: Factory primed and field finished.
- B. Interior Door Frames, Non-Fire Rated: Face welded type.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.

- b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
 - 2. Frame Finish: factory primed.
- C. Fire-Rated Door Frames: Face welded type.
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Frame Metal Thickness: , minimum.
 - 2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C or NFPA 252 ("positive pressure fire tests").
 - 3. Provide units listed and labeled by ITS (DIR) or UL (DIR).
 - a. Attach fire rating label to each fire rated unit.
 - 4. Frame Finish: factory primed.

2.4 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.5 ACCESSORIES

- A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- B. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- C. Frame Anchors: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 1. Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 - 2. Post-installed Expansion Anchor: Minimum 3/8 inch diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
 - 3. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
- D. Astragal and Edges for Double Doors: Pairs of door astrgals, and door edge sealing and protection devices.
- E.
 - 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 INSTALLATION

- A. Install frames in accordance with manufacturer's instructions and related requirements of specified frame standards or custom guidelines indicated.

3.3

- 1.
- 2.
- B. Coordinate frame anchor placement with wall construction.
- C.
 - 1.
 - 2.
- D.
- E. Install door hardware as specified in Section 08 7100.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- F. Coordinate installation of electrical connections to electrical hardware items.
- G.
- H.
- I. Touch up damaged factory finishes.

3.4 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.
- C.

3.5

3.6 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION 08 1213

SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

- A. Section 08 1213 - Hollow Metal Frames.
- B. Section 08 7100 - Door Hardware.

1.3 REFERENCE STANDARDS

- A. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- B. AWI (QCP) - Quality Certification Program; Current Edition.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- D. AWMAC (GIS) - Guarantee and Inspection Services Program; Current Edition.
- E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- F. BHMA A156.2 - Bored and Preassembled Locks and Latches; 2022.
- G. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. NAAMM HMMA 805 - Recommended Selection and Usage Guide for Hollow Metal Doors and Frames; 2012.
- I. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).
- J. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- K. UL (DIR) - Online Certifications Directory; Current Edition.
- L. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- M. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- N. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata (2022).

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
 - 1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- D. Samples: Submit two samples of door veneer, 4 by 6 inches in size illustrating wood grain, stain color, and sheen.
- E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Warranty, executed in Owner's name.

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.
 - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- B. Woodwork Quality Assurance Program:
 - 1. Comply with AWI (QCP) woodwork association quality assurance service/program in accordance with requirements for work specified in this section; www.awiqcp.org/#sle.
 - 2. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
 - 3. Provide designated labels on shop drawings as required by quality assurance program.
 - 4. Provide designated labels on installed products as required by quality assurance program.
 - 5. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
 - 1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Algoma Hardwoods, Inc.
 - 2. Eggers Industries
 - 3. Marshfield Door Systems, Inc.
 - 4. Mohawk Flush Doors, Inc.
 - 5. Oshkosh Door Company.
 - 6. VT Industries, Inc: www.vtindustries.com/#sle.
 - 7. Substitutions: See Section 01 6000 - Product Requirements.
- B. Doors: See drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), AWMAC/WI (NAAWS) or WDMA I.S. 1A.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- C. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location, except where otherwise indicated.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.

2.2 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.3 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Red oak, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

2.4 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:

1. Provide solid blocks at lock edge for hardware reinforcement.
 2. Provide solid blocking for other throughbolted hardware.
- C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- F. Provide edge clearances in accordance with the quality standard specified.

2.5 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
- B. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
1. Stain color and sheen to match existing.
- C. Seal door top edge with clear or colored sealer to match door facing.

2.6 ACCESSORIES

- A. Hollow Metal Door Frames: See Section 08 1213.
- B. Astragals for Fire-Rated Double Doors: Pairs of door astragals, door edge sealing, and protection devices.
1. UL listed products in compliance with requirements of authorities have jurisdiction.
 2. Provide surface mounted astragal to cover or fill space for full door height between pair of doors or door and adjacent jamb.
 3. Edge Type: Beveled edge.
 4. Material: Aluminum.
- C. Door Hardware: See Section 08 7100.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.

1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.

3.3 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.4 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

3.5 SCHEDULE

- A. See Door and Frame Schedule on the drawings.

END OF SECTION 08 1416

SECTION 08 7100 - DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hardware for wood doors.
- B. Hardware for fire-rated doors.
- C. Lock cylinders for doors that hardware is specified in other sections.
- D. Thresholds.
- E. Weatherstripping and gasketing.

1.2 RELATED REQUIREMENTS

- A. Section 08 1213 - Hollow Metal Frames.
- B. Section 08 1416 - Flush Wood Doors.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. BHMA (CPD) - Certified Products Directory; Current Edition.
- C. BHMA A156.1 - Standard for Butts and Hinges; 2025.
- D. BHMA A156.2 - Bored and Preassembled Locks and Latches; 2022.
- E. BHMA A156.3 - Exit Devices; 2025.
- F. BHMA A156.4 - Door Closers and Pivots; 2024.
- G. BHMA A156.5 - Cylinders and Input Devices for Locks; 2020.
- H. BHMA A156.7 - Template Hinge Dimensions; 2022.
- I. BHMA A156.8 - Door Controls - Overhead Stops and Holders; 2021.
- J. BHMA A156.16 - Standard for Auxiliary Hardware; 2023.
- K. BHMA A156.18 - Standard for Materials and Finishes; 2020.
- L. BHMA A156.22 - Standard for Gasketing; 2021.
- M. BHMA A156.28 - Standard for Recommended Practices for Mechanical Keying Systems; 2023.
- N. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.
- O. DHI (H&S) - Sequence and Format for the Hardware Schedule; 2019.

- P. DHI (KSN) - Keying Systems and Nomenclature; 2019.
- Q. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- R. ITS (DIR) - Directory of Listed Products; Current Edition.
- S. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).
- T. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- U. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- V. UL (DIR) - Online Certifications Directory; Current Edition.
- W. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- D. Keying Requirements Meeting:
 - 1. Schedule meeting at project site prior to Contractor occupancy.
 - 2. Attendance Required:
 - a. Contractor.
 - b. Owner.
 - c. Hardware Installer.
 - 3. Agenda:
 - a. Establish keying requirements.
 - b. Verify locksets and locking hardware are functionally correct for project requirements.
 - c. Verify that keying and programming complies with project requirements.
 - d. Establish keying submittal schedule and update requirements.
 - 4. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
 - a. Access control requirements.
 - b. Key control system requirements.
 - c. Schematic diagram of preliminary key system.
 - 5. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
 - 6. Deliver established keying requirements to manufacturers.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
 - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
 - 2. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.
 - 3. List groups and suffixes in proper sequence.
 - 4. Provide complete description for each door listed.
 - 5. Provide manufacturer name, product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
 - 6. Include account of abbreviations and symbols used in schedule.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- F. Keying Schedule:
 - 1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- G. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- H. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.
- C. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

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

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.
 - 1. Closers: Five years, minimum.
 - 2. Exit Devices: Three years, minimum.
 - 3. Locksets and Cylinders: Three years, minimum.
 - 4. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.1 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
 - 1. Applicable provisions of federal, state, and local codes.
 - 2. Accessibility: ADA Standards and ICC A117.1.
 - 3. Applicable provisions of NFPA 101.
 - 4. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 - 5. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for application indicated.
 - 6. Listed and certified compliant with specified standards by BHMA (CPD).
 - 7. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
 - 8. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.
- D. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. See Door Hardware Schedule.
- E. Fasteners:
 - 1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
 - 2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
 - a. Self-drilling (Tek) type screws are not permitted.

3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
4. Provide wall grip inserts for hollow wall construction.
5. Provide spacers or sex bolts with sleeves for through bolting of hollow metal doors and frames.
6. Fire-Rated Applications: Comply with NFPA 80.
 - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
 - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.
7. Concealed Fasteners: Do not use through or sex bolt type fasteners on door panel sides indicated as concealed fastener locations, unless otherwise indicated.

2.2 HINGES

- A. Manufacturers:
 1. Best, dormakaba Group: www.bestaccess.com/#sle.
 2. McKinney; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 3. Hager Companies: www.hagerco.com/#sle.
 4. Ives, an Allegion brand: www.allegion.com/us/#sle.
 5. BEST, dormakaba Group: www.bestaccess.com/#sle.
- B. Hinges: Comply with BHMA A156.1, Grade 1.
 1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
 - a. Provide hinge width required to clear surrounding trim.
 2. Provide hinges on every swinging door.
 3. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 4. Provide non-removable pins on interior outswinging doors at locations as indicated.
 5. Provide following quantity of butt hinges for each door:
 - a. Doors From 60 inches High up to 90 inches High: Three hinges.
 - b. Doors over 90 inches High: One additional hinge per each additional 30 inches in height.

2.3 EXIT DEVICES

- A. Manufacturers:
 1. Von Duprin, an Allegion brand: www.allegion.com/us/#sle.
 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Exit Devices: Comply with BHMA A156.3, Grade 1.
 1. Lever design to match lockset trim.
 2. Provide cylinder with cylinder dogging or locking trim.
 3. Provide exit devices properly sized for door width and height.
 4. Provide strike as recommended by manufacturer for application indicated.
 5. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.

2.4 LOCK CYLINDERS

- A. Manufacturers:
 - 1. Match Owner's existing.
- B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
 - 1. Provide standard and full size interchangeable core (FSIC) type cylinders, Grade 1, with six-pin core in compliance with BHMA A156.5 at locations indicated.
 - 2. Provide cylinders from same manufacturer as locking device.
 - 3. Provide cams and/or tailpieces as required for locking devices.
 - 4. Within specific Door Sections, when provisions for lock cylinder are being referenced to this Section, provide specified lock cylinder and keyed to building keying system, unless otherwise indicated.

2.5 CYLINDRICAL LOCKS

- A. Manufacturers:
 - 1. BEST, dormakaba Group; 8K Series: www.bestaccess.com/#sle.
 - 2. Schlage, an Allegion brand: www.allegion.com/us/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 1, 4000 Series.
 - 1. Bored Hole: 2-1/8 inch diameter.
 - 2. Latchbolt Throw: 1/2 inch, minimum.
 - 3. Backset: 2-3/4 inch unless otherwise indicated.
 - 4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
 - a. Finish: To match lock or latch.
 - 5. Provide lockset or latchset with function as specified in door hardware schedule.
 - 6. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.

2.6 CLOSERS

- A. Manufacturers; Surface Mounted:
 - 1. BEST, dormakaba Group: www.bestaccess.com/#sle.
 - 2. LCN, an Allegion brand: www.allegion.com/us/#sle.
- B. Closers: Comply with BHMA A156.4, Grade 1.
 - 1. Type: Surface mounted to door.
 - 2. Provide accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.
 - 3. Provide closers with functions as specified in door hardware schedule.
 - 4. Provide door closer on each fire-rated and smoke-rated door.
 - a. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.
 - 5. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.
 - 6. At corridor entry doors, mount closer on room side of door.
 - 7. At outswinging exterior doors, mount closer on interior side of door.

2.7 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders (Door Checks): Comply with BHMA A156.8, Grade 1.
 - 1. Provide stop for every swinging door, unless otherwise indicated.

2.8 KICK PLATES

- A. Manufacturers:
 - 1. Burns Manufacturing, Inc.: www.burnsmfg.com
 - 2. Hiawatha, Inc, an Activar Construction Products Group company: www.activarcpg.com/hiawatha/#sle.
 - 3. Ives, an Allegion brand: www.allegion.com/us/#sle.
 - 4. Trimco: www.trimcohardware.com/#sle.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
 - 1. Size: 10 inch (254 mm) high by 2 inch less door width (LDW) on push side of door.

2.9 WALL STOPS

- A. Manufacturers:
 - 1. Burns Manufacturing, Inc.; 570 Series: www.burnsmfg.com
 - 2. Hager Companies; 230 Series: www.hagerco.com/#sle.
 - 3. Ives, an Allegion brand; WS406 Series: www.allegion.com/us/#sle.
 - 4. Trimco: www.trimcohardware.com/#sle.
- B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
 - 1. Type: Bumper, concave, wall stop.
 - 2. Material: Aluminum housing with rubber insert.

2.10 ASTRAGALS

- A. Manufacturers:
 - 1. Hager Companies: www.hagerco.com/#sle.
 - 2. National Guard Products, Inc: www.ngpinc.com/#sle.
 - 3. Reese Enterprises, Inc: www.reeseusa.com/#sle.
 - 4. Standard Metal Hardware Manufacturing Ltd: www.smhardware.com/#sle.
 - 5. Zero International, Inc: www.zerointernational.com/#sle.
- B. Astragals: Comply with BHMA A156.22.
 - 1. Type: Split, two parts, and with sealing gasket.
 - 2. Material: Aluminum, with neoprene weatherstripping.
 - 3. Provide non-corroding fasteners at exterior locations.

2.11 WEATHERSTRIPPING AND GASKETING

- A. Manufacturers:

1. Dunbarton Corporation: www.dunbarton.com/#sle.
2. Pemko; an Assa Abloy Group company: www.assaabloydss.com/#sle.
3. National Guard Products, Inc: www.ngpinc.com/#sle.
4. Reese Enterprises, Inc: www.reeseusa.com/#sle.
5. Zero International, Inc: www.zerointernational.com/#sle.
6. Substitutions: See Section 01 6000 - Product Requirements.

- B. Weatherstripping and Gasketing: Comply with BHMA A156.22.
1. Head and Jamb Type: Adjustable.
 2. Door Sweep Type: Encased in retainer.
 3. Material: Aluminum, with neoprene gasket.

2.12 KEY CONTROL SYSTEMS

- A. Key Control Systems: Comply with guidelines of BHMA A156.28.
1. Provide keying information in compliance with DHI (KSN) standards.
 2. Keying: Grand master keyed.
 3. Include control keying with removable core cylinders.
 4. Key to existing keying system.

2.13 FINISHES

- A. Finishes: Provide door hardware of same finish, unless otherwise indicated.
1. Primary Finish: 625; bright chromium plated over nickel, with brass or bronze base material (former US equivalent US26); BHMA A156.18.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Use templates provided by hardware item manufacturer.
- D. Do not install surface mounted items until application of finishes to substrate are fully completed.
- E. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list, unless noted otherwise on drawings.
1. For Steel Door Frames: See Section 08 1213.
 2. Flush Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
 3. Mounting heights in compliance with ADA Standards:

- F. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.3 ADJUSTING

- A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.4 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.5 PROTECTION

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

END OF SECTION 08 7100

SECTION 08 7100.13 - DOOR HARDWARE SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule of door hardware sets for swinging doors as indicated on drawings.

1.2 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware: Requirements to comply with in coordination with this section.
- B. Section 08 7113 - Power Door Operators: Requirements for power door operators.

1.3 REFERENCE STANDARDS

- A. BHMA A156.18 - Standard for Materials and Finishes; 2020.

1.4 SUBMITTALS

- A. Comply with submittal requirements as indicated in Section 08 7100.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Only manufacturers listed in Door Hardware Schedule or Section 08 7100 are considered acceptable, unless noted otherwise.
- B. Obtain each type of door hardware as indicated from a single manufacturer and single supplier.
- C. Products are listed and certified compliant with specified standards by BHMA (CPD).
- D. Manufacturer's Abbreviations: Coordinate with manufacturers listed in Section 08 7100.
 - 1. COR - Corbin Russwin.
 - 2. FAL - Falcon.
 - 3. GLY - Glynn Johnson.
 - 4. HAG - Hager.
 - 5. IVE - Ives.
 - 6. LCN - LCN.
 - 7. NGP - National Guard Products.
 - 8. REE - Reese
 - 9. ROC - Rockwood.
 - 10. SCH - Schlage.
 - 11. VON - Von Duprin.

2.2 DESCRIPTION

- A. Door hardware sets provided represent the design intent, they are only a guideline and should not be considered a detailed or complete hardware schedule.
 - 1. Necessary items that are not included in a Hardware Set should be added and have the appropriate additional hardware as required for proper application and functionality.
 - 2. Door hardware supplier is responsible for providing proper size and hand of door for products required in accordance with Door Hardware Schedule and as indicated on drawings.
 - 3. Quantities listed are for each Pair (PR) of doors, or for each Single (SGL) door, as indicated in hardware sets.

2.3 LOCK FUNCTION CODES

- A. Function Codes for Cylindrical Locks: Complying with BHMA A156.5.
 - 1. Code F75; Passage: Latch retracted by knobs/levers at all times.
 - 2. Code F76; Privacy Lock: Outside knob/lever locked by pushbutton on inside knob/lever. Rotating inside knob/lever or closing door releases/unlocks button. Emergency release in outside knob/lever.
 - 3. Code F80; Communicating Lock: Deadlocking latch bolt by levers except when either lever is locked by key in its own cylinder.
 - 4. Code F84; Classroom Lock: Outside knob/lever locked/unlocked by key in outside knob/lever. Inside knob/lever always free. Deadlocking latchbolt.
 - 5. Code F86; Storeroom Lock: Outside knob/lever always locked/rigid. Latchbolt retracted by key in outside knob/lever or by rotating inside knob/lever. Inside knob/lever always free. Deadlocking latchbolt.
 - 6. Code F109; Entry/Office Lock: Turn/Push button locking. Pushing and turning button on inside locks outside knob/lever requiring use of a key until button is manually unlocked. Push button locking. Pushing button locks the outside knob/lever until unlocked by key or by turning the inside knob/lever. Inside knob/lever always free.
 - 7. Code F110; Classroom Security Lock: Key cylinder both sides. Outside lever locked/unlocked by key in either lever. Inside lever always free.
- B. Function Codes for Exit Devices: Complying with BHMA A156.3.
 - 1. Code 01; Exit Device: Exit only/no trim.
 - 2. Code 03; Exit Device: Entrance by trim when latchbolt is retracted by key (pullside). Unit is locked when the key is removed.
 - 3. Code 08; Exit Device: Entrance by knob/lever. Key (pullside) locks/unlocks knob/lever.

2.4 FINISHES

- A. Finishes: Complying with BHMA A156.18.
 - 1. Code 626: Satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D).
 - 2. Code 628: Clear anodized aluminum.
 - 3. Code 630: Satin stainless steel, with stainless steel 300 series base material (former US equivalent US32D).
 - 4. Code 652: Satin chromium plated over nickel, with steel base material (former US equivalent US26D).

PART 3 EXECUTION

3.1 DOOR HARDWARE SCHEDULE

- A. Organize listing of door hardware components within each hardware set in compliance with 10-Part scheduling sequence indicated in DHI (H&S), unless otherwise indicated.
- B. **HARDWARE SCHEDULE NOTES:**
1. Wall stop or overhead stop to be provided where scheduled as installation configuration warrants.
 2. ADD door seal set to all smoke- or fire-resistance rated doors - see Door Schedule. Gasketing to be ZRO 188S or approved equal, length as required.
 3. All doors specified without weatherstripping, gaskets or seals shall have frame silencers. Provide IVE SR64 or approved equal, minimum 3 per door (2 for double doors).
 4. Interface electric strike or latch retraction release operation with door security / lockdown system and power operator where indicated

3.2 **HARDWARE SET #01:**

- A. For use on Door Number(s): 101A, 101B.

		ITEM	DESCRIPTION		
HAG	6 EA.	HINGES	BB1168 - 4 1/2" X 4 1/2" - US26D		
LCN	2 EA.	CLOSER	4040XP - HSCUSH - ALUM		
VON	2 EA.	EXIT DEVICE	9927L #17 3' US26D LBR		
COR	2 EA.	RIM CYLINDER	3000-200-626		
ROC	2 EA.	KICK PLATES	K1050 - 10" x 35" - US32D		
NGP	2 EA.	ASTRAGAL	A605A - 84"		
NGP	1 ROLL	GASKETING	2525B - 20'		

3.3 **HARDWARE SET #02**

- A. For use on Door Number: 101C.

		ITEM	DESCRIPTION		
HAG	6 EA.	HINGES	BB1168 - 4 1/2" X 4 1/2" - US26D		
LCN	1 EA.	OVERHEAD STOP	451H - SP28		
LCN	1 EA.	CLOSER	4040XP - Hw/PA - ALUM		
VON	1 EA.	EXIT DEVICE	9975L #17 3' US26D		
COR	1 EA.	MORTISE CYLINDER	1000-114-626		
ROC	1 EA.	FLUSHBOLT	555 - US32D		
ROC	1 EA.	DP STRIKE	570 - US32D		
ROC	2 EA.	WALL STOP	409 - US32D		
ROC	1 EA.	KICK PLATES	K1050 - 10" X 19" - US32D		
ROC	1 EA.	KICK PLATES	K1050 - 10" X 34" - US32D		
NGP	1 EA.	ASTRAGAL	A605A - 84"		
NGP	1 ROLL	GASKETING	2525B - 27'		

3.4 **HARDWARE SET #2.1- ALTERNATE:**

A. For use on Door Number: 101C.

		ITEM	DESCRIPTION		
HAG	6 EA.	HINGES	BB1168 - 4 1/2" X 4 1/2" - US26D		
LCN	1 EA.	OVERHEAD STOP	451H - SP28		
LCN	1 EA.	AUTO OPERATOR	4642 - REG - ALUM		
LCN	2 EA.	ACTUATOR	8310-856T		
LCN	2 EA.	SURFACE BOX	8310-868S		
VON	1 EA.	EXIT DEVICE	QEL9975L #17 3' US26D		
COR	1 EA.	MORTISE CYLINDER	1000-114-626		
VON	1 EA.	POWER SUPPLY	PS902-2RS		
VON	1 EA.	POWER TRANSFER	EPT-10-SP28		
ROC	1 EA.	FLUSHBOLT	555 - US32D		
ROC	1 EA.	DP STRIKE	570 - US32D		
ROC	2 EA.	WALL STOP	409 - US32D		
ROC	1 EA.	KICK PLATES	K1050 - 10" X 19" - US32D		
ROC	1 EA.	KICK PLATES	K1050 - 10" X 34" - US32D		
NGP	1 EA.	ASTRAGAL	A605A - 84"		
NGP	1 ROLL	GASKETING	2525B - 27'		

3.5 **HARDWARE SET #3.1 - ALTERNATE:**

A. For use on Door Number: 104.

		ITEM	DESCRIPTION		
LCN	1 EA.	AUTO OPERATOR	4642 - REG - ALUM		
LCN	2 EA.	ACTUATOR	8310-856T		
LCN	2 EA.	SURFACE BOX	8310-868S		
LCN	1 EA.	WEATHER RING	8310-800		
GLY	1 EA.	OVERHEAD STOP	904S US32D		
SCHE	1 EA.	DOOR CORD	798-18		
SCHE	1 EA.	DOOR POSITION SWITCH	679-05HM		
VON	1 EA.	EXIT DEVICE	LX-RX-QEL-997SNL 3' US26D		
COR	1 EA.	MORTISE CYLINDER	1000-114-626		
VON	1 EA.	POWER SUPPLY	PS902-2RS		
		CARD READER	BY DIV. 28 1000 - CONTROLLED ACCESS SYSTEMS		

END OF SECTION 08 7100.13

SECTION 08 7113 - POWER DOOR OPERATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Operators for swinging doors.
- B. Controllers, actuators, and safety devices.
- C. Maintenance.

1.2 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware: Balance of door hardware.

1.3 DEFINITIONS

- A. Activation Device: Device that sends an electrical signal to door operator to open door when actuated.

1.4 REFERENCE STANDARDS

- A. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- C. BHMA A156.10 - Power Operated Pedestrian Doors; 2024.
- D. BHMA A156.19 - Power Assist and Low Energy Power Operated Swinging Doors; 2019.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate power door operators with balance of door hardware and electrical work required for each affected door opening.
 - 1. Templates: Check other sections' shop drawings to confirm that adequate provisions are in place for locating and installing power door operators.
 - 2. Electrical System Roughing-in: Coordinate layout and installation of power door operators with connections to power supplies, remote activation devices, and electric door latching hardware.
- B. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by affected installers and the following parties.
 - 1. Architect.

2. Owner's Security Consultant.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
- C. Product Data: Provide data on system components, sizes, features, and finishes.
- D. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience and approved by manufacturer.

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 2-year manufacturer warranty for components of power door operators. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Operators for Swinging Doors:
 - 1. ASSA ABLOY Entrance Solutions: www.besam-usa.com/#sle.
 - 2. BEST, dormakaba Group: www.bestaccess.com/#sle.
 - 3. LCN, an Allegion brand: www.allegion.com/us/#sle.

2.2 POWER DOOR OPERATORS - GENERAL

- A. Electrically Operated or Controlled Hardware: Provide necessary power supplies, relays, and interfaces as required for proper operation; provide wiring between control components and to building power connection in compliance with NFPA 70.
- B. Comply with ADA Standards for egress requirements.
- C. Comply with NFPA 101 and requirements of authorities having jurisdiction; provide units selected for actual door weight and for light pedestrian traffic unless otherwise indicated.
- D. Exterior Doors: Provide units capable of operating, closing, and holding doors closed under positive and negative differential pressure; if necessary, provide power closing.

- E. System Integration: Integrate operator functionality with other systems as required for a complete working installation.
 - 1. Door Operator must work with Minot University's existing NewVision Security of Bismarck for programming and wire specifications.
 - 2. Provide controller output signals at the door closed or door open positions to facilitate interaction with security and access control systems.

2.3 OPERATORS FOR SWINGING DOORS

- A. Door Operator: Electromechanical.
 - 1. Applications: Include operators for double doors.
 - 2. Electromechanical Operators: Self-contained unit powered by permanent magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, connections for power and activation and safety device wiring, and manual operation, including spring closing when power is off.
 - 3. Speed Control: Variable, field-adjustable opening and closing cycles.
 - 4. Functionality: Low-energy power open, spring close operation.
 - a. Low-Energy Power Operators: Comply with BHMA A156.19; operator activated by pushing or pulling the door or by manual actuator, not a sensor; safeties not required.
 - 1) Force Required to Prevent Stopped Door From Opening or Closing: 15 lbf, maximum, measured at 1 inch from the latch edge of the door at any point in the swing cycle.
 - 2) Force Required to Release Latch When Unpowered: 15 lbf, maximum, measured at 1 inch from the latch edge of the door at any point in the swing cycle.
 - 3) Force Required to Set Door in Motion When Unpowered: 30 lbf, maximum, measured at 1 inch from the latch edge of the door at any point in the closing cycle.
 - 4) Force Required to Fully Open Door When Unpowered: 15 lbf, maximum, measured at 1 inch from the latch edge of the door at any point in the closing cycle.
 - 5) Signage: Provide signage in accordance with BHMA A156.19.
 - 5. Components:
 - a. Header Case: Manufacturer's standard extruded aluminum profile containing door operator and door mounting components.
 - b. Motor and Gearbox Assembly: Manufacturer's standard sealed motor, gearbox, and drive belt.
 - 6. Power Supply Units: Self-contained, electrically operated, and independent of door operator.
 - 7. Actuators: Manufacturer's standard.
 - a. Actuator, both sides: Push plate, round, with accessibility symbol and "PUSH TO OPEN".
 - b. Actuator, pull-side: Push plate, round, with accessibility symbol and "PUSH TO OPEN".
 - 8. Pull-Side Safety: Door mounted.

2.4 CONTROLLERS, ACTUATORS, AND SAFETY DEVICES

- A. Controllers: Manufacturer's standard for products specified.
 - 1. Provide microprocessor operated controller for each door.
- B. Actuators: Manufacturer's standard for products specified and as specified below.
 - 1. Comply with BHMA A156.10 for actuator and safety types and zones.
 - 2. Push Plate Actuator: Standard, wall mounted, surface mounted, momentary contact type; satin stainless steel plate; 4-1/2 inches diameter; labeled with the international symbol for accessibility and "PUSH TO OPEN" engraved on the surface.
- C. Safety Devices: Manufacturer's standard units recommended for project applications and conditions.
 - 1. Comply with BHMA A156.10 for actuator and safety types and zones.

2.5 ELECTRICAL CHARACTERISTICS AND COMPONENTS

- A. Electrical Characteristics:
 - 1. 5 rated load amperes.
 - 2. 120 volts, single phase, 60 Hz.
- B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
- C. Disconnect Switch: Factory mount disconnect switch in control panel.

2.6 FINISHES

- A. Aluminum Finishes: Manufacturer's standard.
 - 1. Anodized finish to match door system.
 - 2. Class I Natural Anodized Finish: Clear anodic coating; AAMA 611 AA-M12C22A41, minimum dry film thickness (DFT) of 0.7 mil, 0.0007 inch.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify installation conditions including, but not limited to the following: opening sizes, floor conditions, plumb and level mounting surfaces.
- B. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
- C. Verify that electric power is available, in the correct location, and of the correct characteristics. Verify that required electrical conduits, boxes, and raceways are installed and in correct location.

3.2 INSTALLATION

- A. Coordinate installation of components with related and adjacent work.

- B. Install equipment in accordance with manufacturer's instructions.

3.3 ADJUSTING

- A. Adjust door equipment for correct function and smooth operation.

3.4 CLEANING

- A. Remove temporary protection, clean exposed surfaces.

3.5 CLOSEOUT ACTIVITIES

- A. Demonstrate to Owner's representative equipment operation, operating components, adjustment features, and lubrication requirements.

END OF SECTION 08 7113

SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Acoustic insulation.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.
- E. Textured finish system.

1.2 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- C. Section 09 2216 - Non-Structural Metal Framing.

1.3 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.
- C. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2025.
- D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
- E. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- F. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2024.
- G. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- H. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
- I. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2026.

- J. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- K. GA-216 - Application and Finishing of Gypsum Panel Products; 2024.
- L. GA-600 - Fire Resistance and Sound Control Design Manual; 2024.
- M. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. UL (DIR) - Online Certifications Directory; Current Edition.
- O. UL (FRD) - Fire Resistance Directory; Current Edition.
- P. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide data on gypsum board, accessories, and joint finishing system.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:

1. Fire-Resistance-Rated Partitions: See ratings on drawings.

2.2 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 1. American Gypsum Company: www.americangypsum.com/#sle.
 2. CertainTeed Corporation: www.certainteed.com/#sle.
 3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 4. Gold Bond Building Products, LLC provided by National Gypsum Company: www.goldbondbuilding.com/#sle.
 5. PABCO Gypsum: www.pabco gypsum.com/#sle.
 6. USG Corporation: www.usg.com/#sle.
 7. Substitutions: See Section 01 6000 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 1. Application: Use for vertical surfaces, unless otherwise indicated.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
 - b. Mold resistant board is required at all locations.
 3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 4. Thickness:
 - a. Vertical Surfaces: 5/8 inch.

2.3 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed mineral-fiber, friction fit type, unfaced; thickness as required for STC.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Beads, Joint Accessories, and Other Trim: ASTM C1047; rigid plastic, galvanized steel, rolled zinc, or unless noted otherwise.
 1. Corner Beads: Low profile, for 90 degree outside corners.
 2. L-Trim with Tear-Away Strip: Sized to fit 5/8-inch thick gypsum wallboard.
 3. Expansion Joints:
 - a. Fire-Resistance Rated: 1 hour when joint system tested in accordance with UL 2079.
 - b. Type: V-shaped PVC with tear away fins.
 - c. Type: V-shaped metal with factory-installed protective tape.
 - d. Type: Off-angle inside corner expansion.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 1. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 2. Joint Compound: Drying type, vinyl-based, ready-mixed.

- E. Textured Finish Materials: Latex-based compound; plain.
- F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- G. Nails or staples are not an acceptable fastening method.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.
- B. Verify recess-mounted items and installed and in correct configuration.

3.2 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place continuous bead at perimeter of each layer of gypsum board.
 - 2. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.3 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Cut board neatly to minimize gap around recess-mounted devices.
- C. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

3.4 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and according to ASTM C840 and GA-216
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
 - 2. Install wall control joints up from corners of openings as indicated on Drawings and as directed by Architect.
 - 3. Install control joints in fire-resistance rated walls according to GA-234.
- B. Corner Beads: Install at external corners, using longest practical lengths.

- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.5 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 3: Walls to receive textured wall finish.
 - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 - 4. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
- D. Fill and finish around recess-mounted access panels, expansion joint assemblies and other devices without perimeter trim.
- E. Ensure edge of GWB finish will be fully concealed by device trims.
- F. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.6 TEXTURE FINISH

- A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions to match existing building.

3.7 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.8 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.

3.9 PROTECTION

- A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION 09 2116

SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal partition and soffit framing.
- B. Framing accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking within stud framing.
- B. Section 07 2100 - Thermal Insulation: Acoustic insulation.
- C. Section 07 8400 - Firestopping: Sealing top-of-wall assemblies at fire-resistance-rated walls.
- D. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- E. Section 09 2116 - Gypsum Board Assemblies: Metal studs for gypsum board partition framing.
- F. Section 09 2116 - Gypsum Board Assemblies: Execution requirements for anchors for attaching work of this section.

1.3 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2024.
- B. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.
- D. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2025.
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- H. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

- I. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2026.
- J. ASTM E413 - Classification for Rating Sound Insulation; 2022.
- K. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2024.
- L. GA-600 - Fire Resistance and Sound Control Design Manual; 2024.
- M. UL (FRD) - Fire Resistance Directory; Current Edition.
- N. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
- C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Framing, Connectors, and Accessories:
 - 1. CEMCO: www.cemcosteel.com/#sle.
 - 2. ClarkDietrich: www.clarkdietrich.com/#sle.
 - 3. MarinoWARE: www.marinoware.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 FRAMING MATERIALS

- A. Fire-Resistance-Rated Assemblies: Comply with applicable code and as indicated on drawings.
- B. Firestopping: Materials meeting requirements necessary to maintain rating of penetrated assembly.
 - 1. See Section 07 8400.
 - 2. Fire Ratings: See drawings for required systems and ratings.
- C. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220.
 - 1. Structural Grade: As required to meet design criteria.
- D. Nonstructural Framing System Components: AISI S220; sheet steel, of size and properties necessary for spacing indicated on drawings, with maximum wall framing deflection of L/240 at 5 psf.

1. Studs: C-shaped with flat faces.
 2. Runners: U-shaped, sized to match studs.
- E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws, and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code when evaluated in accordance with AISI S100.
 2. Material: ASTM A653/A653M steel sheet, SS Grade 50.
- F. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.
- G. Nonstructural Framing Accessories:
1. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
 - a. Material: ASTM A653/A653M formed steel sheet support with factory-welded ASTM A1003/A1003M steel plate base.
 2. Bracing and Bridging: ASTM A653/A653M, G90 galvanized steel; for lateral bracing of wall studs with slots for engaging on-module studs.
 3. Framing Connectors: ASTM A653/A653M steel clips; secures cold rolled channel to wall studs for lateral bracing.
 4. Fasteners: ASTM C1513 self-piercing, self-tapping screws.
 5. Anchorage Devices: Powder actuated.

2.3 FABRICATION

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.
- C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that rough-in utilities are in proper location.

3.2 INSTALLATION OF STUD FRAMING

- A. Install non-structural members in accordance with ASTM C754.
- B. Extend partition framing to structure in all locations.
- C. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

- D. Align and secure top and bottom runners at 24 inches on center.
- E. Install studs vertically at 16 inches on center unless indicated otherwise in Drawings.
- F. Align stud web openings horizontally.
- G. Secure studs to tracks using crimping method. Do not weld.
- H. Stud splicing is not permissible.
- I. Fabricate corners using a minimum of three studs.
- J. Install double studs at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- K. Brace stud framing system rigid.
- L. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- M. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- N. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and opening frames.
 - 1. Utilize fire-retardant treated wood blocking as required.
- O. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches.

3.3 SOFFIT FRAMING

- A. Comply with requirements of ASTM C754.
- B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- C. Install furring independent of walls, columns, and above-ceiling work.
- D. Securely anchor hangers to structural members or embed them in structural slab. Space hangers as required to limit deflection to criteria indicated.

3.4 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION 09 2216

SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient base.
- B. Installation accessories.

1.2 RELATED REQUIREMENTS

- A. Section 09 6519 - Resilient Tile Flooring.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Verification Samples: Submit two samples, 9 by 9 inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Wall Base: 10 linear feet for every 500 linear feet (152 m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

1.5 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.1 RESILIENT BASE

- A. Resilient Base - (RB-1): ASTM F1861, Class 1, Group I, Type TS, rubber, vulcanized thermoset; Style B, Cove. Provide Style C where indicated in Drawings.
 - 1. Manufacturers:
 - a. Flexco Corporation: www.flexcofloors.com
 - b. Johnsonite, a Tarkett Company; Baseworks Thermoset Rubber: www.johnsonite.com
 - c. Roppe Corporation: www.roppe.com
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Height: 4 inches.
 - 3. Thickness: 0.125 inch.
 - 4. Finish: Manufacturer's standard.
 - 5. Length: Roll.
 - 6. Corners: Job-formed or preformed.
 - 7. Color: To be selected by Architect from manufacturer's full range.

2.2 ACCESSORIES

- A. Adhesives: Waterproof; types recommended by flooring manufacturer.
- B. Moldings, Transition and Edge Strips: Same material as flooring.
 - 1. Description: Rubber carpet edge for glue-down applications, nosing for carpet, nosing for resilient floor covering, and reducer strip for resilient floor covering.
 - 2. Profiles: As indicated in Drawings.
 - 3. Color: As selected from manufacturer's full range.
- C. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that wall and floor surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient accessories.

3.2 PREPARATION

- A. Prepare floor and wall substrates as recommended by resilient accessory and adhesive manufacturers.
- B. Clean substrate.
- C. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.3 INSTALLATION - GENERAL

- A. Install in accordance with manufacturer's written instructions. Install accessories in longest pieces as practicable.
- B. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.
 - 3. Inspect installations and reinstall any resilient base or accessory that has detached from substrate.
- C. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. Do not locate seams in transition or edge strips within obvious walking paths.
 - 1. Resilient Strips: Attach to substrate using adhesive.

3.4 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units. Do not cut the base toe at outside corners.
- C. Do not seam base within 6 inches of a field-formed outside corner. Locate seams in wall base at inside corners where possible
- D. Install base on solid backing. Bond tightly to wall and floor surfaces. Install without excessive bulging, bucking or gaps to flooring surface.
- E. Scribe and fit to door frames and other interruptions.

3.5 CLEANING

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

END OF SECTION 09 6513

SECTION 09 6519 - RESILIENT TILE FLOORING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Installation accessories.

1.2 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- B. Section 09 6513 - Resilient Base and Accessories: Resilient base, transitions, stair treads.
- C. Section 09 6516 - Resilient Sheet Flooring

1.3 REFERENCE STANDARDS

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Verification Samples: Submit two samples, ____ by ____ inch in size illustrating color and pattern for each resilient flooring product specified.
- D. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- E. Manufacturer's Qualification Statement.
- F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Flooring Material: _____ square feet of each type and color.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Do not double stack pallets.

1.7 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.1 TILE FLOORING

- A. Vinyl Tile - Type RTF-1: Printed film type, with transparent or translucent wear layer; acoustic interlayer or backing.
 - 1. Manufacturers:
 - a. J&J Flooring Group.
 - 2. Minimum Requirements: Comply with ASTM F1700, Class III.
 - 3. Impact Insulation Class (IIC): 57, minimum, when floor-ceiling assembly tested in accordance with ASTM E492.
 - 4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648.
 - 5. Mold and Microbial Resistance: Highly resistant when tested in accordance with ASTM D6329.
 - 6. VOC Content Limits: As specified in Section 01 6116.
 - 7. Plank Tile Size: 9 by 48 inch.
 - 8. Total Thickness: 0.20 inch.
 - 9. Tile Edge: Straight.
 - 10. Color: As indicated on drawings.

2.2 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: See Section 09 6513 - Resilient Base and Accessories.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

3.2 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.

3.3 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- G. Install flooring in recessed floor access covers, maintaining floor pattern.

3.4 INSTALLATION - TILE FLOORING

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

3.5 CLEANING

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

3.6 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 09 6519

SECTION 09 6813 - TILE CARPETING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Carpet tile, fully adhered.
- B. Removal of existing carpet tile.

1.2 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 6513 - Resilient Base and Accessories: Resilient wall base and accessories installed with tile carpeting.

1.3 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016 (Reapproved 2021).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.
- C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
- D. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- E. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- F. CRI 104 - Standard for Installation of Commercial Carpet; 2018.
- G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- D. Accessory Samples: Submit two 12 inch long samples of edge strip and _____.

- E. Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Tile Carpeting:
 - 1. J+J Flooring LLC; www.jjflooringgroup.com

2.2 MATERIALS

- A. Tile Carpeting, Type CPT-1: Tufted, manufactured in one color dye lot.
 - 1. Tile Size: 24 by 24 inch, nominal.
 - 2. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
 - 3. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
 - 4. VOC Content: Provide CRI (GLP) certified product; in lieu of labeling, independent test report showing compliance is acceptable.
 - 5. Gauge: 1/12 inch.
 - 6. Stitches: 10 per inch.
 - 7. Pile Weight: 19 oz/sq yd.

2.3 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Adhesives:
 - 1. Compatible with materials being adhered; maximum VOC content as specified in Section 01 6116.
- C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test as Follows:
 - a. Internal Relative Humidity: ASTM F2170.
 - b. Moisture Vapor Emission: ASTM F1869.
 - 2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
- D. Wood Subfloors: Verify the following:
- E. Painted Subfloors: Perform bond test recommended in writing by adhesive manufacturer. Verify the following:
- F. Access Flooring Systems: Verify that access floor substrate is compatible with carpet tile and adhesive if any.
- G. Verify that required floor-mounted utilities are in correct location and set at correct height.

3.2 PREPARATION

- A. Remove existing carpet tile.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
- D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- E. Vacuum clean substrate.

3.3 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions and CRI 104 (Commercial).
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Maintain dye-lot integrity. Do not mix dye lots in same area.

- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended in writing by carpet tile manufacturer.
- F. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- G. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- H. Install carpet tile as required in access panel and floor box inserts to match flooring pattern.
- I. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- J. Unless otherwise indicated, locate change of color or pattern between rooms under door leaf or at centerline of opening.
- K. Fully adhere carpet tile to substrate.
- L. Trim carpet tile neatly at walls and around interruptions.
- M. Complete installation of edge strips, concealing exposed edges.

3.4 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION 09 6813

SECTION 09 8433 - SOUND-ABSORBING WALL UNITS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
 - 1. Sound-absorbing wall panels.

1.3 DEFINITIONS

- A. NRC: Noise Reduction Coefficient.
- B. SAA: Sound Absorption Average.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include fabric facing and panel edge indicated.
- B. Shop Drawings: For unit assembly and installation.
 - 1. Include plans, elevations, sections, and mounting devices and details.
 - 2. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
 - 3. Include details at cutouts and penetrations for other work.
 - 4. Include direction of fabric weave and pattern matching.
- C. Samples for Initial Selection: For each type of fabric facing.
 - 1. Include Samples of hardware and accessories involving color or finish selection.
- D. Samples for Verification: For the following products:
 - 1. Fabric: Full-width by approximately 36 inch (915 mm) long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
 - 2. Panel Edge: 12 inch (305 mm) long Sample(s) showing each edge profile, corner, and finish.
 - 3. Core Material: 12 inch (305 mm) square Sample at corner.

4. Mounting Devices: Full-size Samples.
5. Assembled Panels: Approximately 36 by 36 inches (900 by 900 mm), including joints and mounting methods.

1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 1. Electrical outlets, switches, and thermostats.
 2. Items penetrating or covered by units including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Alarms.
 - e. Sprinklers.
 - f. Access panels.
 3. Show operation of hinged and sliding components covered by or adjacent to units.
- B. Product Certificates: For each type of unit.
- C. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturer's written cleaning and stain-removal instructions.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fabric: For each fabric, color, and pattern installed, furnish length equal to 10 percent of amount installed, but no fewer than 10 sq. yd. (9 sq. m), full width of bolt.
 2. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices.

1.9 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, and installation.
 1. Build mockup of typical wall area as shown on Drawings. Include intersection of wall and ceiling, corners, and perimeters.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Lighting: Do not install units until a permanent level of lighting is provided on surfaces to receive the units.
- C. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.
- D. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.12 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Acoustical performance.
 - b. Fabric sagging, distorting, or releasing from panel edge.
 - c. Warping of core.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall units specified in this Section, and ceiling units specified in Section 09 8436 "Sound-Absorbing Ceiling Units", from single source from single manufacturer.
- B. Manufacturers: All products of each type by the same manufacturer, unless noted otherwise.
 - 1. Basis of Design Product: Subject to compliance with requirements, provide [product indicated in the drawings, or a comparable product by one of the following:](#)
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 286.

2.3 SOUND-ABSORBING WALL UNITS

- A. Sound-Absorbing Wall Panel, Type SAW-1 : Manufacturer's standard panel construction consisting of facing material PET Felt.
 - 1. Panel Shape: As indicated on Drawings.
 - 2. Mounting: Edge mounted with splines secured to substrate.
 - a. Finish Color at Exposed Edges: Match color of facing material.
 - 3. Mounting: Back mounted with manufacturer's standard metal clips or bar hangers, secured to substrate.
 - 4. Core: Manufacturer's standard.
 - 5. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
 - 6. Edge Profile: Custom profile as indicated on Drawings.
 - 7. Corner Detail in Elevation: Square with continuous edge profile indicated.
 - 8. Reveals between Panels: Flush reveals as selected by Architect from manufacturer's full range.
 - 9. Facing Material: As indicated on Drawings.
 - 10. Acoustical Performance: Sound absorption NRC of 0.50 to 0.90 according to ASTM C423 for Type A mounting according to ASTM E795.
 - 11. Nominal Overall Panel Thickness: 1 inch (25 mm).
 - 12. Panel Width: As indicated on Drawings.
 - 13. Panel Height: As indicated on Drawings.

2.4 MATERIALS

- A. Core Materials: Manufacturer's standard.
- B. Mounting Devices: Concealed on back or top edge of unit, recommended by manufacturer to support weight of unit.
 - 1. Metal Clips or Bar Hangers: Manufacturer's standard two-part metal "Z" clips, with one part of each clip mechanically attached to back of unit and the other part to substrate, designed to permit unit removal.

2.5 FABRICATION

- A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated, with facing material applied to face, edges, and back border of dimensionally stable core and with rigid edges to reinforce panel perimeter against warpage and damage.
- B. Measure each area and establish layout of panels and joints of sizes indicated on Drawings within a given area.
- C. Edge Hardening: For _____ cores, chemically harden core edges and areas of core where mounting devices are attached.
- D. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
 - 1. Square Corners: Tailor corners.
 - 2. Radius and Other Nonsquare Corners: Attach facing material so there are no seams or gathering of material.
 - 3. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches adjacent units.
- E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch (1.6 mm) for the following:
 - 1. Thickness.
 - 2. Edge straightness.
 - 3. Overall length and width.
 - 4. Squareness from corner to corner.
 - 5. Chords, radii, and diameters.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install units in locations indicated. Unless otherwise indicated, install units with edges in alignment with walls and other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
- C. Align fabric pattern and grain as indicated on Drawings.

3.3 INSTALLATION TOLERANCES

- A. Variation from Alignment with Surfaces: Plus or minus 1/16 inch (1.6 mm) in 48 inches (1200 mm), noncumulative.
- B. Variation from Level or Slope: Plus or minus 1/16 inch (1.6 mm).
- C. Variation of Joint Width: Not more than 1/16 inch (1.6 mm). wide from in hairline 48 inches (1200 mm), noncumulative.

3.4 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 09 8433

SECTION 09 9000 - PAINTING AND COATING - COMMERCIAL FACILITY GUIDE SPECIFICATION - SHERWIN-WILLIAMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Interior painting and coating systems.
- C. Exterior painting and coating systems.
- D. Scope:
 - 1. Finish surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - a. Exterior:
 - 1) Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, ferrous metal.
 - b. Interior:
 - 1) Concrete Ceilings: Poured concrete, precast concrete, cement board, cast-in-place concrete, and plaster.
 - 2) Masonry CMU: Concrete, split face, scored, smooth, high density, low density, and fluted.
 - 3) Metal, Galvanized: Ceilings and ductwork.
 - 4) Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and ferrous metal.
 - 5) Drywall: Walls, ceilings, gypsum board, and similar items.
 - 6) Concrete: Floors, non-vehicular.

1.2 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- C. SSPC-SP 2 - Hand Tool Cleaning; 2024.
- D. SSPC-SP 6/NACE No.3 - Commercial Blast Cleaning; 2006.
- E. SSPC-SP 13/NACE No.6 - Surface Preparation of Concrete; 2018.

1.3 SUBMITTALS

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

- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Product characteristics.
 - 2. Surface preparation instructions and recommendations.
 - 3. Primer requirements and finish specification.
 - 4. Storage and handling requirements and recommendations.
 - 5. Application methods.
 - 6. Clean-up information.
- C. Samples: Submit four paper draw down samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Applicator's qualification statement.
- F. Maintenance Data: Submit coating maintenance manual including finish schedule showing where each product/color/finish was used, product technical data sheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to manufacturer's label.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, product name, product code, color designation, VOC content, batch date, environmental handling, surface preparation, application, and use instructions.
- C. Paint Materials: Store at a minimum of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.6 FIELD CONDITIONS

- A. Do not apply materials when environmental conditions are outside the ranges required by manufacturer.

- B. Follow manufacturer's recommended procedures for producing the best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design Products: Subject to compliance with requirements, provide Sherwin-Williams Company (The) products indicated; www.sherwin-williams.com/#sle.

2.2 PAINTINGS AND COATINGS

- A. General:
 - 1. Provide factory-mixed coatings unless otherwise indicated.
 - 2. Do not reduce, thin, or dilute coatings or add materials to coatings unless specifically indicated in manufacturer's instructions.
- B. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

2.3 PAINT SYSTEMS - EXTERIOR

- A. Metal, Miscellaneous: Iron, ornamental iron, structural iron and steel, ferrous metal.
 - 1. Latex Systems:
 - a. Semi-Gloss Finish:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
 - a) 5 to 10 mils wet, 1.8 to 3.6 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series: www.sherwin-williams.com/#sle.
 - a) 2 to 4 mils dry per coat.

2.4 PAINT SYSTEMS - INTERIOR

- A. Concrete Ceilings: Poured concrete, precast concrete, cement board, cast-in-place concrete, and plaster.
 - 1. Dryfall Waterborne Topcoats:
 - a. Flat Finish:
 - 1) 1st and 2nd Coat: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-181 Series: www.sherwin-williams.com/#sle.
 - a) 6 mils wet, 1.7 mils dry per coat.
- B. Masonry CMU: Concrete, split face, scored, smooth, high density, low density, and fluted.
 - 1. Latex Systems:
 - a. Eg-Shel/Satin Finish:
 - 1) 1st Coat: Sherwin-Williams PrepRite Block Filler, B25W25: www.sherwin-williams.com/#sle.

- a) 75 to 125 sq ft/gal.
 - 2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 Zero VOC Eg-Shel, B20-2600 Series: www.sherwin-williams.com/#sle.
 - a) 4 mils wet, 1.7 mils dry per coat.
- C. Metal, Galvanized: Ceilings and ductwork.
 - 1. Dryfall Waterborne Topcoats:
 - a. Semi-Gloss Finish:
 - 1) 1st and 2nd Coat: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-83 Series: www.sherwin-williams.com/#sle.
 - b. Flat Finish:
 - 1) 1st and 2nd Coat: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-181 Series: www.sherwin-williams.com/#sle.
 - a) 6 mils wet, 1.7 mils dry per coat.
- D. Metal: Structural steel columns, joists, trusses, beams, miscellaneous and ornamental iron, structural iron, and ferrous metal.
 - 1. Latex Systems:
 - a. Semi-Gloss High Performance:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
 - a) 5 mils wet, 2 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Acrylic Semi-Gloss, B66-650 Series: www.sherwin-williams.com/#sle.
 - a) 2 to 4 mils dry per coat.
 - 2. Dryfall Waterborne Topcoat:
 - a. Flat Finish:
 - 1) 1st Coat: Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer, B66-1310 Series: www.sherwin-williams.com/#sle.
 - a) 5 mils wet, 2 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-181 Series: www.sherwin-williams.com/#sle.
 - a) 6 mils wet, 1.7 mils dry per coat.
- E. Drywall: Walls, ceilings, gypsum board, and similar items.
 - 1. Latex Systems:
 - a. Eg-Shel Finish:
 - 1) 1st Coat: Sherwin-Williams ProMar 200 Zero VOC Interior Latex Primer, B28W2600: www.sherwin-williams.com/#sle.
 - a) 4 mils wet, 1.5 mils dry per coat.
 - 2) 2nd and 3rd Coat: Sherwin-Williams ProMar 200 Zero VOC Eg-Shel, B20-2600 Series: www.sherwin-williams.com/#sle.
 - a) 4 mils wet, 1.7 mils dry per coat.
- F. Concrete: Floors, non-vehicular.
 - 1. Latex Systems:
 - 2. Clear Acrylic System, Gloss Finish:

- a. First Coat:
 - 1) S-W H&C Clarishield Water-Based Wet-Look Concrete Sealer, at 100 to 200 sq. ft. per gal. (2.45 to 4.91 sq. m per liter).
- b. Second Coat:
 - 1) S-W H&C Clarishield Water-Based Wet-Look Concrete Sealer, at 100 to 200 sq. ft. per gal. (2.45 to 4.91 sq. m per liter).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove mildew from impervious surfaces by scrubbing with solution of water and bleach. Rinse with clean water and allow surface to dry.
- D. Concrete:
 - 1. Remove release agents, curing compounds, efflorescence, and chalk.
 - 2. Fill bug holes, air pockets, and other voids with cement patching compound.
- E. Masonry: Remove efflorescence and chalk.
- F. Cementitious Siding: Remove dirt, dust and other foreign matter. Pressure clean, if needed, to remove grease, oil, and loose particles.
- G. Gypsum Board: Fill minor defects with filler compound; sand smooth and remove dust prior to painting.
- H. Plaster: Fill hairline cracks, small holes, and imperfections with patching plaster. Make smooth and flush with adjacent surfaces. Treat textured, soft, porous, or powdery surfaces in accordance with manufacturer's instructions.
- I. Concrete Floors and Traffic Surfaces: Prepare concrete in accordance with SSPC-SP 13/NACE No.6.
- J. Aluminum: Remove surface contamination and oil; wash with solvent according to SSPC-SP 1.
- K. Galvanized Surfaces:

1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
2. Prepare surface according to SSPC-SP 2.

L. Ferrous Metal:

1. Solvent clean according to SSPC-SP 1.
2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Prime bare steel surfaces.
3. Remove rust, loose mill scale, and other foreign substances using methods recommended by paint manufacturer and blast cleaning in accordance with SSPC-SP 6/NACE No.3. Protect from corrosion until coated.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions.
- C. Apply coatings at spread rate required to achieve manufacturer's recommended dry film thickness.

3.4 PRIMING

- A. Apply primer to all surfaces unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- B. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to top coat manufacturers.

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Clean surfaces immediately of overspray, splatter, and excess material.
- C. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.

3.6 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 09 9000

SECTION 10 1423 - PANEL SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Panel signage.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
 - 1. Include dimensions, locations, materials, text and graphic layout, attachment details, and schedules.
 - 2. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
 - b. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
 - c. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, indicating sign style, font, and method of attachment.
- E. Selection Samples: Where colors, materials, and finishes are not specified, submit two sets of color selection charts or chips.
- F. Manufacturer's qualification statement.

1.4 QUALITY ASSURANCE

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

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.

1.6 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Panel Signage:
 - 1. Inpro Corporation; _____: www.inprocorp.com/#sle.
 - 2. Takeform: www.takeform.net/#sle.

2.2 REGULATORY REQUIREMENTS

- A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.3 PANEL SIGNAGE

- A. Panel Signage:
 - 1. Application: Room and door signs.
 - 2. Description: Flat signs with engraved panel media, tactile characters.
 - 3. Sign Size: As indicated on drawings.
 - 4. Total Thickness: 1/8 inch.
 - 5. Sign Edges: Squared.
 - 6. Letter Edges: Squared.
 - 7. Corners: Squared.
 - 8. Color and Font, unless otherwise indicated:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 - b. Character Case: Upper case only.
 - c. Background Color: As scheduled.
 - d. Character Color: Contrasting color.
 - 9. Material: Acrylic plastic base with applied plastic letters and braille.
 - 10. Profile: Flat panel without frame.
 - 11. Tactile Letters: Raised 1/32 inch minimum.
 - 12. Braille: Grade II, ADA-compliant.
 - 13. One-Sided Wall Mounting: Concealed screws.

2.4 ACCESSORIES

- A. Concealed Screws: Noncorroding metal; stainless steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.
- C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Protect from damage until date of Substantial Completion; repair or replace damaged items.

END OF SECTION 10 1423

SECTION 10 2600 - WALL AND DOOR PROTECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Corner guards.

1.2 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Blocking for wall and corner guard anchors.
- B. Section 08 7100 - Door Hardware: Standard protection plates and trim.
- C. Section 09 2116 - Gypsum Board Assemblies: Placement of supports in stud wall construction.

1.3 REFERENCE STANDARDS

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2026.
- B. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents; 2021.
- C. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2023.
- D. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.
- C. Shop Drawings: Include plans, elevation, sections, and attachment details. Show design and spacing of supports for protective corridor handrails, required to withstand structural loads.
- D. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
 - 1. Submit two sections of corner guards, 24 inches long.
- E. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention, and _____.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed 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 01 6000 - Product Requirements, for additional provisions.

2. Extra Stock Materials: One package(s) of minimum 96 inches long unit of each kind of covers for corner guards.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Protect work from moisture damage.
- C. Protect work from UV light damage.
- D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.
- E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.6 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 5-year manufacturer warranty for metal crash rails. Complete forms in Owner's name and register with manufacturer.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures or internal connection failures.
 - b. Deterioration of materials beyond that expected of normal use, as intended by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Corner Guards:
 1. Construction Specialties, Inc; Acrovyn Corner Guards: www.c-sgroup.com/#sle.
 2. Inpro Corporation; Corner Guards - Surface Mounted: www.inprocorp.com/#sle.

2.2 PERFORMANCE CRITERIA

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.
- B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.
- C. Fungal Resistance: Unless otherwise noted, provide protection products and assemblies which pass ASTM G21 testing.

2.3 PRODUCT TYPES

- A. Corner Guards - Surface Mounted:
 - 1. Material: High impact vinyl with full height extruded aluminum retainer.
 - 2. Thickness: 0.075 inch.
 - 3. Width of Wings: 2 inches.
 - 4. Corner: Square.
 - 5. Color: As selected from manufacturer's standard colors.
 - 6. Length: One piece, 96 inches.
 - 7. Mounting: Countersunk screws through factory-drilled holes.

2.4 FABRICATION

- A. Fabricate components with tight joints, corners and seams.
- B. Pre-drill holes for attachment.
- C. Form end trim closure by capping and finishing smooth.

2.5 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that field measurements are as indicated on drawings.
- C. Verify that substrate surfaces for adhered items are clean and smooth.
- D. Start of installation constitutes acceptance of project conditions.

3.2 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Position corner guard 4 inches above finished floor to 96 inches high.

3.3 TOLERANCES

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

3.4 CLEANING

- A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION 10 2600

SECTION 12 3600 - COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Countertops for architectural cabinet work.
- B. Sinks molded into countertops.
- C. Epoxy resin sinks.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

- A. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2020.
- B. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2023.
- C. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- D. AWI (QCP) - Quality Certification Program; Current Edition.
- E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- F. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- G. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- H. PS 1 - Structural Plywood; 2023.
- I. WI (CCP) - Certified Compliance Program (CCP); Current Edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.

- C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- F. Sustainable Design Submittal: Documentation for sustainably harvested wood-based components.
- G. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- H. Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- I. NSI Fabricator Qualification: Documentation of Natural Stone Institute Accreditation.
- J. Installer's qualification statement.
- K. Installation Instructions: Manufacturer's installation instructions and recommendations.
- L. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Natural Stone Institute (NSI) Accredited Natural Stone Fabricator; www.naturalstoneinstitute.org/#sle.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- C. Quality Certification:
 - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.
 - a. This AWI (QCP) project is registered as project number _____.
 - 2. Comply with WI (CCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.woodworkinstitute.com/#sle.
 - 3. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
 - 4. Provide designated labels on shop drawings as required by certification program.
 - 5. Provide designated labels on installed products as required by certification program.
 - 6. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 COUNTERTOPS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Epoxy Resin Countertops: Filled epoxy resin molded into homogenous, non-porous sheets; no surface coating and color and pattern consistent throughout thickness; with integral or adhesively seamed components.
 - 1. Manufacturers:
 - a. Durcon, Inc, _____: www.durcon.com/#sle.
 - b. OnePointe Solutions LLC; Epoxy Resin Countertops: www.onepointesolutions.com/#sle.
 - c. Prime Industries, Inc, _____: www.piilab.com/#sle.
 - 2. Flat Surface Thickness: 1 inch, nominal.
 - 3. Chemical-Resistance: Provide products that resist the following chemicals with not more than Moderate Effect when tested in accordance with NEMA LD 3:
 - 4. Flammability: Self-extinguishing, when tested in accordance with ASTM D635.
 - 5. NSF approved for food contact.
 - 6. Surface Finish: Smooth, non-glare.
 - 7. Color: Black.
 - 8. Exposed Edge Shape in Sink Areas: Built-up marine edge 1/4 inch higher than counter by 1 inch wide.
 - 9. Drip Edge: Drip groove 1/8 inch wide and deep, located 1/2 inch back from edge on underside of all exposed edges.
 - 10. Sinks: Same material, same color; integrally molded with counter; bottom sloped to outlet; molded outlets; drain outlet located in back corner.
 - a. Sides and Ends: 1/2 inch minimum thickness.
 - b. Bottoms: 5/8 inch minimum thickness.
 - c. Interior Corners: 1 inch minimum radius.
 - d. Clamping collars for 1-1/2 or 2 inch diameter waste pipe, for sealed but not permanent connection.
 - e. Steel channel supports front to back on each side, fastened to underside of top to support twice full sink weight.
 - 11. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.
 - 12. Fabricate in accordance with manufacturer's standard requirements.

2.2 MATERIALS

- A. Extruded Aluminum: ASTM B211/B211M, 6463 alloy, T5 temper.
- B. Wood-Based Components:
 - 1. Wood fabricated from old growth timber is not permitted.
 - 2. Provide sustainably harvested wood, certified or labeled; see Section 01 6000 - Product Requirements.
- C. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- D. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- E. Joint Sealant: Mildew-resistant silicone sealant, white.

2.3 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of tops using best method recommended by manufacturer.
 - 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 - a. Rout a 1/8 inch drip groove at underside of exposed overlapping edges, set back 1/2 inch from face of edge.
 - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

- B. Attach epoxy resin countertops using compatible adhesive.
- C. Seal joint between back/end splashes and vertical surfaces.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.5 CLEANING

- A. Clean countertops surfaces thoroughly.

3.6 PROTECTION

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

END OF SECTION 12 3600

SECTION 12 6100 - FIXED AUDIENCE SEATING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fixed, upholstered audience seating.
- B. Seating accessories.

1.2 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 26 0533.23 - Surface Raceways for Electrical Systems.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A879/A879M - Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface; 2022.
- C. ASTM D3597 - Standard Performance Specification for Woven Upholstery Fabrics—Plain, Tufted, or Flocked; 2002 (Reapproved 2024).
- D. ASTM E1352 - Standard Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies; 2016.
- E. ASTM E1537 - Standard Test Method for Fire Testing of Upholstered Furniture; 2022.
- F. BIFMA X5.4 - Public and Lounge Seating; 2020 (Reaffirmed 2025).
- G. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2024.
- H. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- I. NFPA 261 - Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes; 2023.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination with Electrical Work: Coordinate installation of wiring to ensure that floor-mounted junction boxes are completely beneath seats and free of aisle spaces.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.

1. Include construction details, material descriptions, dimensions of components, and finishes for fixed audience seating.
 2. Include electrical characteristics of electrical components, devices, and accessories.
- C. Shop Drawings: Fabrication and installation details, chair layouts and dimensions and seat numbering scheme.
1. Include plans, elevations, sections, and attachment details.
 2. Seating Layout: Show seating layout, aisle widths, aisle-end alignment or stepping, row-lettering and chair numbering scheme, chair widths, and chair spacing in each row.
 3. Accessories: Show locations and features of accessories, including left and right hand tablet arms, electrical devices, and accessibility provisions.
 4. Field Measurements: Verify seating layout by field measurements and record field dimensions on shop drawings.
- D. Selection Samples: Manufacturer's color charts and swatches for fabric upholstery, indicating full range of materials, colors, and patterns available.
- E. Verification Samples: For each type of exposed finish required, prepare on Samples of size indicated below:
1. Molded Plastic: Manufacturer's standard size unit, not less than 3 inches square.
 2. Plastic Laminate: Manufacturer's standard size unit, not less than 3 inches square.
 3. Baked on Coating Finishes: Manufacturer's standard size unit, not less than 3 inches square.
 4. Upholstery Fabric: Full width by 36 inch long section of fabric from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
 5. Power and Data Service Devices: Full size units.
 6. Exposed Fasteners: Full size units of each type.
- F. Installer's qualification statement.
- G. Informational Submittals
1. Coordination Drawings:
 - a. Coordinate location of electrical wiring and devices of seating layout to ensure that floor junction boxes for electrical devices are accurately located to allow connection without exposed conduit.
 2. Product Certificates: For each type of fixed audience seating.
 3. Material Certificates: For each type of flame retardant treatment of upholstery fabric.
 4. Sample Warranty: For special warranty.
- H. Maintenance Materials Submittals:
1. See Section 01 6000 - Product Requirements, for additional provisions.
 2. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - a. Chair Seats and Backs: Two of each type and size of chair seat and back.
 - b. Upholstered, Slip-on Cushions: Two of each type and size of cushion.
 - c. Fabric: 5 percent on the total of quantity installed for each type.
 - d. Tablet Arms: Two of each type and size of tablet arm; left and right hand mounted.
 - e. Armrests: Two of each type of armrest.
 - f. Power Receptacles/USB : Two of each.

- g. Chair Seat Hinges: Five of quantity installed.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer certified in writing by the seating manufacturer to be qualified for installation of specified seating.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver seats to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. Store seating units in dry and clean location until needed for installation. During installation, handle in a manner that will prevent marring and soiling of finished surfaces.

1.8 FIELD CONDITIONS

- A. Ambient Conditions: Do not install seating until space is enclosed and weatherproof, wet-work in space is complete and nominally dry, installation of finishes including painting is complete, and ceilings are complete.

1.9 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Warranty: Special Warranty: Manufacturer agrees to repair or replace components of fixed audience seating that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including standards, beams, and pedestals.
 - b. Faulty operation of self-rising seat mechanism.
 - c. Faulty operation of electrical components.
 - d. Wear and deterioration of fabric and stitching beyond normal use.
 - e. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Periods: As follows, from date of Substantial Completion.
 - a. Structural: 10 years.
 - b. Operating Mechanisms: Five years.
 - c. Electrical Components: Five years.
 - d. Plastic, Wood, and Paint Components: Five years.
- C. Manufacturer Warranty: Provide 10-year manufacturer warranty for interior fixed audience seating. Complete forms in Owner's name and register with manufacturer.
- D. Installer Warranty: Provide 10-year warranty for installation of interior fixed audience seating commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with installer.
- E. Extended Correction Period: Correct defective work within a 10-year period after Date of Substantial Completion. Replace parts that fail under normal use at no extra charge to Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fixed Audience Seating: Assembly space seating in permanent arrangement as indicated on Drawings:
- B. Manufacturers: subject to compliance with requirements, provide products from one of the following:
 - 1. Basis of Design: Irwin Seating Company; www.irwinseating.com.
 - 2. Hussey Seating Company; _____: www.husseyseating.com/#sle.
- C. Provide all fixed audience seating by one manufacturer.

2.2 UPHOLSTERED SEATING

- A. Description: Fixed seating system designed to permit radial installation using common middle support standards in each row and aisle standards aligned as indicated on drawings. Width of seats not less than 22 inches, except exit seat locations may be reduced to 20 inches to complete specific row dimensions.
- B. Performance Criteria:
 - 1. Fire Retardance of Upholstered Seating: Self-extinguishing when mock-up is exposed to smoldering cigarettes in accordance with ASTM E1352 or NFPA 261.
 - 2. Fire Retardance of Fixed Audience Seating: Maximum instantaneous net peak rate of heat release of 250 kW or less, and total energy released during first 5 minutes of 40 mJ or less, when tested in accordance with ASTM E1537.
 - 3. Strength and Durability: Comply with BIFMA X5.4 standards for seats, backs, armrests, and standards.
- C. Support Standards: Sheet steel with formed edges and with welded mounting points for backs, seats, and arm rests, and welded floor anchor plates.
 - 1. Basis of Design: Irwin No. 4 Steel platform.
- D. Backs: Fixed type; two-panel construction with fabric covering over padding and protective back panel, with installed height not less than 32 inches above finished floor.
 - 1. Padding: Polyurethane foam not less than 2 inches thick bonded to structural support.
 - 2. Covering: Fabric bonded to padding and fastened by upholstery technique that facilitates replacement.
 - 3. Outer Back: One-piece injection molded high-impact plastic, with scuff-resistant textured surface.
 - 4. Basis of Design: Irwin No. 90 Citation.
- E. Seats: Hinged type, constructed to permit reupholstering without removing seat from chair.
 - 1. Steel Seat Construction: One-piece sheet steel pan construction, reinforced at stress points; supporting not fewer than 16 coil springs or five nonsag serpentine springs. Separate padding from springs with burlap sheeting cemented to polyurethane foam padding formed with minimum thickness of 1-3/4 inches. Upholster with fabric sewn into box construction without welts and securely fastened to supporting frame to provide smooth, wrinkle-free surface.

- a. For serpentine spring construction, provide not less than 3-inch thick foam padding at front edge of seat.
 - b. Basis of Design: Irwin No. 12 Ergo.
- F. Hinges: Self-lubricating, noiseless steel hinges with brass alloy bearings or nylon bushings, equipped with spring mechanism that causes unoccupied seat to rise automatically to uniform 3/4 fold, with 100 percent fold when additional pressure is applied.
- G. Arm Rests: Locate at aisles and between chairs; mount to support standard with concealed fasteners; exposed surfaces of solid lumber or hardwood plywood covered with plastic laminate.
- H. End Panels: One piece panels fastened securely to aisle standards with concealed fasteners, configured as follows:
 - 1. Shape: Rectangular with curved bottom edge.
 - 2. Finish: Plastic laminate.
 - 3. Basis of Design: Irwin No. 14 Veneer end panel.

2.3 MATERIALS

- A. Sheet Steel: ASTM A879/A879M, Commercial Steel (CS) or Drawing Steel (DS) electrogalvanized sheet, 04Z (12G) coating class on both surfaces; chemically treated for baked enamel finish.
- B. Exposed Hardwood: Solid lumber selected for absence of visible defects; birch, couma, northern hard maple, white oak, species standard with manufacturer, or _____.
- C. Hardwood Plywood: HPVA HP-1; face veneers for exposed surfaces Grade A birch, couma, hard maple, walnut, or as standard with manufacturer, with no visible defects; concealed surface veneers of sound grade hardwood.
- D. Plastic Laminate: NEMA LD 3, Type 1, Grade GP 50, nominal thickness 0.050 inch; colors and patterns as selected from manufacturer's standards.
- E. Polypropylene Sheet: Molded high density plastic with minimum tensile strength of 3300 psi, integral color pigments, and textured, scuff-resistant surface finish.
- F. Polyurethane Foam: Density not less than 1.8 lb/cu ft, fire retardant, non-hardening and non-oxidizing, with high resistance to alkalis, oils, moisture, and mildew.
- G. Upholstery Fabric: ASTM D3597 heavy-duty plain woven nylon fabric, treated to resist cigarette ignition and staining; color and pattern as selected from manufacturer's standards.

2.4 FINISHES

- A. Ferrous Metals: Manufacturer's standard electrostatic epoxy-polyester oven baked powder coating in semi luster black color textured finish, applied over conversion coating appropriate to base metal.
 - 1. Color and Gloss: As selected from manufacturer's standard options.
- B. Hardwood: Manufacturer's standard clear low-gloss finish.
- C. Hardwood Plywood: Manufacturer's standard clear low-gloss finish.

2.5 ACCESSORIES

- A. Folding Tablet Arms: At standard to right side of each seat, provide manufacturer's standard fold-away tablet arm assembly, with hinge and swivel mechanism securely fastened to underside of writing surface and designed to provide solid support in the open position and semi-automatic return to stowed position beneath right arm rest and parallel to right standard.
 - 1. Finish: Plastic laminate both sides, with smooth, rounded edges.
 - 2. Size: Writing surface not less than 150 sq inches (X-Large tablet).
- B. Seat and Aisle Numbers: Manufacturer's standard seat numbers securely fastened to front edge of folding seats and row numbers securely fastened to aisle arm rests; anodized aluminum finish, with letters and numbers countersunk and filled with black paint; recessed mounting.
- C. Power and Data System: Provide UL-approved raceways and terminals for power and USB power connections under the chair.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine floors, risers, substrates, and other adjacent work and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Verify that electrical connections are properly located.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's installation instructions and approved shop drawings.
- B. Anchor support standards securely to substrate with at least two anchoring devices recommended by manufacturer.
 - 1. Place standards in each row laterally so the standards at the aisle will be in alignment.
 - 2. Vary width of seats and backs as required to optimize sightlines, and comply with the ADA Standards for row and aisle widths.
 - 3. In curved rows, install standards to form smooth radius, without breaks or angled chords
 - 4. Attach components to standards with sufficient flexibility to compensate for convergence of seats toward the center.
 - 5. Install wiring conductors and cables concealed in components of seating and accessible for servicing.
 - a. Connect electrical service at junction box locations in accordance with Section 26 0519 "Low Voltage Electrical Power Conductors and Cables."

3.3 ADJUSTING

- A. Adjust seat mechanisms to ensure that seats in each row are aligned when unoccupied.
- B. Repair minor abrasions and imperfections in painted finishes with a coating that matches factory-applied finish; replace units that cannot be repaired to unblemished appearance.

- C. Replace upholstery fabric damaged or soiled during installation.
- D. Adjust chair backs so they are at required angles and aligned with each other in uniform rows.
- E. Adjust hardware and moving parts to function smoothly so they can operate easily. Lubricate bearings and sliding parts as recommended in writing by manufacturer.

END OF SECTION 12 6100

SECTION 12 6101 - FIXED TABLE SYSTEMS

1.1 SUMMARY

- A. Section Includes:
 - 1. Lecture-hall tables.

1.2 PREINSTALLATION MEETINGS

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

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. Lecture-hall tables.
- B. Product Data Submittals: For each product.
 - 1. Include construction details, material descriptions, dimensions of components, and finishes for fixed table system.
 - 2. Include electrical characteristics of electrical components, devices, and accessories.
- C. Shop Drawings:
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Lecture-Hall Tables: Show table layout.
 - 3. Accessories: Show locations and features of accessories, including electrical devices, and accessibility provisions.
 - 4. Include diagrams for power, signal, and control wiring.
- D. Samples for Initial Selection: For each type of exposed color, finish, texture, and pattern indicated.
 - 1. Include Samples of accessories involving color and finish selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings:
 - 1. Coordinate location of electrical wiring and devices eating layout to ensure that floor junction boxes for electrical devices are accurately located to allow connection without exposed conduit.
 - 2. Coordinate location of diffuser pedestals with HVAC work and with properties of diffuser pedestals to ensure alignment, proper air diffusion, and correct seat locations.
- B. Field quality-control reports.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fixed audience seating to include in operation and maintenance manuals.

1. In addition to items specified in Section 01 7823 "Operation and Maintenance Data," include the following:
 - a. Maintenance of electrical components, devices, and accessories.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Power Receptacles: 5 percent of quantity installed.
 2. Data Ports: 5 percent of quantity installed.
 3. Aisle-Lighting Fixture Bulbs: 5 percent of quantity installed.

1.7 MOCKUPS

- A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 1. Build mockups of one lecture table, including finishes and accessories:
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of fixed audience seating that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including standards, beams, and pedestals.
 - b. Faulty operation of electrical components.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 2. Warranty Periods: As follows, from date of Substantial Completion.
 - a. Structural: 10 years.
 - b. Electrical Components: Five years.
 - c. Plastic, Wood, and Paint Components: Five years.

PART 2 - PRODUCTS

2.1 REFERENCE STANDARDS

- A. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.
- B. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2024.
- C. ISO 4586-3 - High-Pressure Decorative Laminates (HPL, HPDL) – Sheets Based on Thermosetting Resins (Usually Called Laminates) – Part 3: Classification and Specifications for Laminates Less than 2 mm Thick and Intended for Bonding to Supporting Substrates; 2018.

- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. PS 1 - Structural Plywood; 2023.

2.2 SOURCE LIMITATIONS

- A. Obtain each type of seating required, including accessories and mounting components, from single source from single manufacturer.
 - 1. Upholstery Fabric: Obtain fabric of a single dye lot for each color and pattern of fabric required.

2.3 LECTURE-HALL TABLES

- A. Lecture-Hall Tables: Continuous tables in permanent arrangement as indicated on Drawings.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Sedia Systems M-50 Fixed Table System; or comparable product by one of the following or approved equal:
 - a. KI.
 - b. Sitmatic.
 - c. TSI Group.
- B. Supports: Attached to floor and matching construction and finish structure for fixed audience seating.
- C. Table Top: Manufacturer's standard construction, plastic laminate on MDF with rounded edges and concealed mounting.
 - 1. Depth: Manufacturer's standard.
- D. Modesty Panels: Manufacturer's standard construction, matching table top.
 - 1. Height: 24 inches.
- E. Power and Data Service Package: Manufacturer's standard service to each seat position indicated, including terminal devices and wiring with 18 inches of extra length and as follows:
 - 1. Power Receptacles: 120 V with wiring and duplex receptacle and USB connections.
 - 2. Data Ports: Data-port terminal with wiring and receptacle jack of type indicated.
 - 3. Location: Manufacturer's standard location.

2.4 MATERIALS AND FINISHES

- A. MDF (Medium-Density Fiberboard): ANSI A208.2, Grade MD.
- B. Concealed Plywood: HPVA HP-1 hardwood plywood or DOC PS 1 softwood plywood as standard with manufacturer.
- C. Exposed Plywood: HPVA HP-1, Face Grade A, hardwood-veneer core with color-matched hardwood-veneer faces.
- D. Hardwood Lumber and Veneer Faces: Maple selected to be free of visible defects.
 - 1. Stain and Finish: As selected by Architect from manufacturer's full range.
- E. Plastic Laminate: ISO 4586-3, manufacturer's standard grade.

1. Color and Pattern: As selected by Architect from manufacturer's full range.
- F. Molded Plastic: High-density polyethylene or polypropylene, blow or injection molded, with surface that is mar and dent resistant.
 1. Provide with UV inhibitors to retard fading.
 2. Color and Texture: As selected by Architect from manufacturer's full range.
- G. Metal Finish: Finish exposed metal parts with manufacturer's standard coating.
 1. Color: As selected by Architect from manufacturer's full range.
- H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine floors, risers, and other adjacent work and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Verify that electrical connections are properly located.
- C. Verify that HVAC air-distribution locations are correct.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install tables in locations indicated and fasten to substrates in accordance with manufacturer's written installation instructions.
- B. Where tables is indicated in curved rows, install tables at a constant radius unless otherwise indicated.
- C. Install wiring conductors and cables concealed in components of tables and accessible for servicing.
 1. Connect electrical service at junction-box locations in accordance with Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."
 2. Connect data communication service at junction-box locations in accordance with Section 271523 "Communications Optical Fiber Horizontal Cabling."

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Inspect components, assemblies, and equipment, including connections, to verify proper, complete, and sturdy installation in accordance with manufacturer's written instructions and product specifications.
 2. Verify that self-rising seats return to uniform at-rest, raised position.
 3. Test power receptacles as specified in Section 262726 "Wiring Devices" when power is activated.
 4. Test data ports when data connection is activated.

- B. Fixed audience seating will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so they operate easily. Lubricate bearings and sliding parts as recommended in writing by manufacturer.
- B. Repair minor abrasions and imperfections in finishes with coating that matches factory-applied finish.
- C. Replace damaged and malfunctioning components that cannot be acceptably repaired.

END OF SECTION 12 6101

SECTION 20 0500 - DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes requirements for selective demolition and removal of plumbing, heating, ventilation and air conditioning systems, controls and automated automation components, and related components and incidentals required to complete work described in this Section.

1.2 RELATED SECTIONS

- A. Section 01 74 19 – Construction Waste Management and Disposal

1.3 REFERENCE STANDARDS

- A. CSA Group (CSA)
 - 1. CSA S350, Code of Practice for Safety in Demolition of Structures.

1.4 DEFINITIONS

- A. Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- B. Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged, or removed and reinstalled.
- C. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- D. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- E. Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed and salvaged, or removed and reinstalled.
- F. Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities, and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly as defined by the Federal Hazardous Products Act (RSC 1985) including latest amendments.

1.5 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate work of this Section to avoid interference with work by other Sections.

- B. Account for Owner's continued occupancy requirements during selective demolition and schedule staged occupancy and worksite activities.

1.6 SITE CONDITIONS

- A. The condition of materials identified as being salvaged or demolished are based on their observed condition on date that tender is accepted.

1.7 SALVAGE AND DEBRIS MATERIALS

- A. Demolished items become Contractor's property and will be removed from Project site; except for items indicated as being reused, salvaged, or otherwise indicated to remain Owner's property.
- B. Carefully remove materials and items designated for salvage and store in a manner to prevent damage or devaluation of materials.

PART 2 GENERAL REQUIREMENTS

2.1 GENERAL REQUIREMENTS

- A. Use only new materials required for completion or repair matching materials damaged during performance of work of this Section; new materials are required to meet assembly or system characteristics as existing systems indicated to remain and carry CSA approval labels required by the Authority Having Jurisdiction.
- B. Use listed fire stopping materials compatible with existing fire stopping systems where removal or demolition work affects rated assemblies, restore to match existing fire rated performance.
- C. All work shall be done in a neat, workmanlike, and professional manner.
- D. During construction the contractor shall at all times maintain utilities of the building without interruption. Should it be necessary to interrupt any service or utility, the contractor shall secure permission in writing from the owner for such interruption at least seven days in advance. Any interruption shall be made with minimum amount of inconvenience to the owner.
- E. Should the Contractor take any exceptions to providing any related demolition or relocation work, such exceptions shall be stated in detail within the Prime Contractor's bid. No subsequent allowance to the contract cost shall be made for any insufficient allowances made by the Contractor during bidding which may result from the Contractor's failure to visit job site and review drawings.
- F. It is not the intent of these contract documents that existing conditions be accurately shown. Existing work is shown to a limited extent on drawings and is shown for general planning reference only. Such locations, etc. have been located from portions of contract documents which were prepared for previously installed work (not from "as-builts"). These locations are not guaranteed. The successful Contractor shall have access to all available existing building/system plans and specifications.
- G. The existing systems may be utilized only to the extent indicated herein or on drawings and/or as directed by Owner's representative in field.

- H. Provide complete demolition as required for all systems throughout all project areas not indicated to be salvaged or saved. Unless specifically noted otherwise on plans or determined otherwise during this contractor's pre-demolition survey, all abandoned existing work in the project areas shall be disconnected and removed in its entirety by the Contractor.
- I. Provide demolition work as required to clear and remove all existing work to be abandoned and as required to accommodate all new work of all trades. In general, remove existing related piping, ductwork, control media, etc. back to nearest concealed accessible terminal or take-off "upstream". Extend piping, etc. as required to accommodate new or relocated work.
- J. Demolish all accessible previously abandoned, inactive and obsolete equipment, piping, ductwork, etc. All inaccessible materials embedded in floors, walls, and ceilings may remain if such materials do not interfere with new installations. Coordinate all demolition work carefully with Owner prior to the start of construction.
- K. All demolished piping shall be capped back to active source(s) per contract drawings, even if source(s) are outside of the confines of the project area. Coordinate all demolition work carefully with Owner prior to the start of construction.
- L. Perform cutting and patching required for demolition in accordance with the contract documents.
- M. All piping, ductwork, etc. conflicting with construction related work of any and all trades shall be removed and/or relocated by the Contractor as necessary and/or as directed by Owner's representative in the field. Piping/ductwork disconnections (and/or reconnections) for equipment to be removed (and/or relocated) shall be by the Contractor. This shall apply to all existing work whether shown on drawings or not.
- N. Disposal and Cleanup: Remove from the site and legally dispose of demolished materials and equipment not indicated to be salvaged.
- O. Provide new work as required to accommodate relocations, etc. Routing of all new and piping in existing buildings shall be held tight to structure above wherever possible and shall be approved by owner's representative prior to installation.

2.2 HVAC DEMOLITION

- A. Refer to Division 01 Section covering cutting and patching" and Division 02 Section covering demolition for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - 3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - 4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
 - 5. Equipment to Be Removed: Disconnect and cap services and remove equipment.

6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 8. All piping and ductwork that is not to be reused shall be removed back to the nearest main and capped/plugged with similar material.
- C. If pipe, insulation, or equipment to remain, is damaged in appearance or unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

2.3 PLUMBING DEMOLITION

- A. Refer to Division 01 Section covering cutting and patching" and Division 02 Section covering demolition for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.
1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 6. All piping and ductwork that is not to be reused shall be removed back to the nearest main and capped/plugged with similar material.
- C. If pipe, insulation, or equipment to remain, is damaged in appearance or unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

2.4 EXAMINATION

- A. Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Owner will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.
- B. Identify on-site removal of walls and ceiling to facilitate the work.
- C. Identify on-site testing of ductwork and equipment to facilitate the work.

2.5 PREPARATION

- A. Protect systems and components indicated to remain in place during selective demolition operations and as follows:
1. Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts of existing buildings scheduled to remain.

2. Notify Owner and cease operations where safety of buildings being demolished, adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.
 3. Prevent debris from blocking drainage inlets.
 4. Protect systems that must remain in operation.
 5. Ensure hazardous materials are removed or abated prior to commencing demolition.
 6. For components intended for relocation and reuse, remove, store, protect, clean and reinstall and connect to systems, and recommission.
- B. Sequence demolition work so that interference with the use of the building by the Owner and users is minimized and as follows:
1. Prevent debris from endangering the safe access to and egress from occupied buildings.
 2. Notify Owner and cease operations where safety of occupants appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

2.6 EXECUTION

- A. Disconnect and cap gas supply and electrical services in accordance with requirements of local Authority Having Jurisdiction.
- B. Do not disrupt active or energized utilities without approval of the Owner.
- C. Erect and maintain dust proof and weather tight partitions to prevent the spread of dust and fumes to occupied building areas; remove partitions when complete.
- D. Demolish parts of existing building to accommodate new construction and remedial work as indicated.
- E. At end of each work day, leave worksite in safe condition.
- F. Perform demolition work in a neat and workmanlike manner:
 1. Remove any tools or equipment after completion of work, and leave site clean and ready for subsequent renovation work.
 2. Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.

2.7 CLOSEOUT ACTIVITIES

- A. Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle center).

2.8 DISPOSITION OF REMOVED EQUIPMENT AND MATERIALS

- A. If required to accommodate construction related activities, remove and reinstall any conflicting fixtures, devices or equipment that are to remain.
- B. All fixtures, devices or equipment designated for salvage (removal and reuse, or for turning over to Owner) shall be disconnected and removed undamaged. Disconnect all pigtails, etc. from equipment terminal points and carefully transport and neatly store same to a protected on-site storage location as directed in field.

- C. Components to be reused shall be cleaned (inside and out) and reinstalled where indicated on drawings. Modify and/or extend related existing ductwork and/or piping as required.
- D. Components turned over to Owner shall be neatly stored as groups by system type.

2.9 PRE-EXISTING CODE VIOLATIONS

- A. All existing work which is accessed and/or used under this project shall be inspected and brought into compliance with current codes and standards by the Contractor. This shall apply only to the extent that such work is uncovered in the immediate project areas affected by demolition and/or new construction and only to the limited extent that it applies to pre-existing general installation methods (i.e. a missing hanger/support, a missing seal and other minor incidental work).
- B. If more extensive code or safety violations are discovered by the Contractor, they shall be immediately brought to the attention (detailed in writing) of the Owner's representative along with the contractors proposed cost for corrections.

2.10 INTERIM LIFE SAFETY WORK

- A. Provide interim fire protection (sprinkler) work in all demolition and construction areas for full code coverage. Further definition will be provided in field if required.

2.11 WORK IN EXISTING SPACES

- A. General: Care shall be taken when working in existing spaces so as not to damage existing walls and ceilings where work is being performed.
- B. Existing Ceilings: Where work is being performed above ceilings, and the architectural drawings do not indicate ceiling modifications by the General Contractor, it shall be the responsibility of this contractor to remove and replace existing ceilings where work is being performed. In those instances, all repair and installation of new grid, ceiling panels, etc shall be the responsibility of this contractor. Match existing finishes.

END OF SECTION 20 0500

SECTION 20 0513 - COMMON MOTOR REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.

- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
 - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
 - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating, unless noted otherwise.
- I. Insulation: Class F, unless noted otherwise.
- J. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 - 2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Split phase.
 - 3. Capacitor start, inductor run.
 - 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 20 0513

SECTION 22 0517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe sleeves.
- B. Pipe sleeve-seals.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 09 9113 - Exterior Painting: Preparation and painting of exterior piping systems.
- C. Section 09 9123 - Interior Painting: Preparation and painting of interior piping systems.
- D. Section 22 0523 - General-Duty Valves for Plumbing Piping.
- E. Section 22 0553 - Identification for Plumbing Piping and Equipment: Piping identification.
- F. Section 22 0716 - Plumbing Equipment Insulation.
- G. Section 22 0719 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

- A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2024.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2024.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.
- B. Provide temporary protective coating on cast iron and steel sleeves if shipped loose.

1.6 WARRANTY

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

PART 2 PRODUCTS

2.1 PIPE SLEEVES

- A. Vertical Piping:
 - 1. Sleeve Length: 1 inch above finished floor.
 - 2. Provide sealant for watertight joint.
 - 3. Drilled Penetrations: Provide 1-1/2 inch angle ring or square set in silicone adhesive around penetration.
- B. Plastic or Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.
- C. Pipe Passing Through Below Grade Exterior Walls:
 - 1. Zinc coated or cast iron pipe.
 - 2. Provide watertight space with link rubber or modular seal between sleeve and pipe on both pipe ends.
- D. Pipe Passing Through Mechanical, Laundry, and Animal Room Floors above Basement:
 - 1. Galvanized steel pipe or black iron pipe with asphalt coating.
 - 2. Connect sleeve with floor plate except in mechanical rooms.
- E. Clearances:
 - 1. Provide allowance for insulated piping.
 - 2. Wall, Floor, Partitions, and Beam Flanges: 1 inch greater than external pipe diameter.
 - 3. All Rated Openings: Caulked tight with fire stopping material complying with ASTM E814 in accordance with Section 07 8400 to prevent the spread of fire, smoke, and gases.

2.2 PIPE-SLEEVE SEALS

- A. Modular Mechanical Sleeve-Seal:
 - 1. Elastomer-based interlocking links continuously fill annular space between pipe and wall-sleeve, wall or casing opening.
 - 2. Watertight seal between pipe and wall-sleeve, wall or casing opening.
 - 3. Size and select seal component materials in accordance with service requirements.
 - 4. Service Requirements:
 - a. Corrosion resistant.
 - b. Oil, fuel, gas, and solvent resistant.
 - c. Underground, buried, and wet conditions.
 - d. Fire Resistant: 1 hour, UL (DIR) approved.
 - e. High Temperature, up to 400 degrees F.
 - f. Low temperature, down to minus 67 degrees F.
 - 5. Glass-reinforced plastic pressure end plates.

- B. Sealing Compounds:
 - 1. Provide packing and sealing compound to fill pipe to sleeve thickness.
 - 2. Combined packing and sealing compounding to match partition fire-resistance hourly rating.
- C. Pipe Sleeve Material:
 - 1. Bearing Walls: Steel, cast iron, or terra-cotta pipe.
 - 2. Masonry Structures: Sheet metal or fiber.
- D. Wall Sleeve: PVC material with waterstop collar, and nailer end-caps.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

3.2 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- B. Install piping to conserve building space, to not interfere with use of space and other work.
- C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. 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.
 - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.
- E. Structural Considerations: Do not penetrate building structural members unless indicated.
- F. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
 - 1. Underground Piping: Caulk pipe sleeve watertight with lead and oakum or mechanically expandable chloroprene inserts with bitumen sealed metal components.
 - 2. Aboveground Piping:
 - a. Pack solid using mineral fiber complying with ASTM C592.
 - b. Fill space with an elastomer caulk to a depth of 0.50 inch where penetrations occur between conditioned and unconditioned spaces.
 - 3. All Rated Openings: Caulk tight with fire stopping material complying with ASTM E814 in accordance with Section 07 8400 to prevent the spread of fire, smoke, and gases.

4. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.

G. Manufactured Sleeve-Seal Systems:

1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
3. Locate piping in center of sleeve or penetration.
4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
5. Tighten bolting for a water-tight seal.
6. Install in accordance with manufacturer's recommendations.

- H. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.3 CLEANING

- A. Upon completion of work, clean all parts of the installation.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

END OF SECTION 22 0517

SECTION 22 0719 - PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flexible elastomeric cellular insulation.
- B. Glass fiber insulation.
- C. Jacketing and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 22 1005 - Plumbing Piping: Placement of hangers and hanger inserts.

1.3 REFERENCE STANDARDS

- A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2026.
- D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2025.
- E. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.
- F. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
- G. ASTM C1423 - Standard Guide for Selecting Jacketing Materials for Thermal Insulation; 2021.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- J. SAE AMS3779 - Tape, Adhesive, Pressure-Sensitive Thermal Radiation Resistant, Aluminum Coated Glass Cloth; 2016b.
- K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

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 or UL 723.

2.2 GLASS FIBER INSULATION

- A. Manufacturers:
 - 1. CertainTeed Corporation; _____: www.certainteed.com/#sle.
 - 2. Johns Manville Corporation; _____: www.jm.com/#sle.
 - 3. Knauf Insulation: www.knaufinsulation.com/#sle.
 - 4. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: www.ocbuildingspec.com/#sle.
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
 - 1. K Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 850 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible, with wicking material to transport condensed water to the outside of the system for evaporation to the atmosphere.
 - 1. K Value: ASTM C177, 0.23 at 75 degrees F.
 - 2. Maximum Service Temperature: 220 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- D. Insulation: ASTM C547 and 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.
- E. 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.
- F. Vapor Barrier Lap Adhesive: Compatible with insulation.
- G. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

2.3 CELLULAR GLASS INSULATION

- A. Manufacturers:
- B. Insulation: ASTM C552, Type II, Grade 6.
 - 1. K Value: 0.35 at 100 degrees F.
 - 2. Service Temperature Range: From 250 degrees F to 800 degrees F.
 - 3. Water Vapor Permeability: 0.005 perm inch maximum per inch.
 - 4. Water Absorption: 0.5 percent by volume, maximum.

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
 - 1. Aeroflex USA; AEROFLEX Self-Seal: www.aeroflexusa.com/#sle.
 - 2. Armacell LLC; AP Armaflex: www.armacell.us/#sle.
- B. Insulation: Closed cell preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 - 1. Minimum Service Temperature: Minus 40 degrees F.
 - 2. Maximum Service Temperature: 220 degrees F.
 - 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
- D. Weather Barrier: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.
- E. Application: Domestic Cold Water, Storm Piping where approved.

2.5 JACKETING AND ACCESSORIES

- A. PVC Plastic Jacket:
 - 1. Manufacturers:
 - a. Johns Manville Corporation; _____: www.jm.com/#sle.
 - b. Substitutions: See Section 01 6000 - 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, 0.010 inch.
 - e. Connections: Brush on welding adhesive.
 - 3. Covering Adhesive Mastic: Compatible with insulation.
- B. Aluminum Jacket:
 - 1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
 - 2. Thickness: 0.016 inch sheet.
 - 3. Finish: Smooth.
 - 4. Joining: Longitudinal slip joints and 2 inch laps.
 - 5. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
- C. Aluminum-Foil Laminate Jacket:
 - 1. Manufacturers:
 - 2. Factory-applied, pressure sensitive adhesive jacketing on paper release liner.
 - 3. Finish: Aluminum smooth.
 - 4. Comply with ASTM C1775.
- D. Reinforced Tape:
 - 1. Manufacturers:
 - a. Ideal Tape Co., Inc; _____: www.idealtape.com/#sle.

2. FSK tape suitable for sealing seams between insulation, insulated pipe bends, and fittings resulting in a tight, smooth surface without wrinkles.
3. Comply with UL 723 or ASTM E84.
4. Moisture Vapor Permeability: 0.00 perm inch, when tested in accordance with ASTM E96/E96M.
5. Finish: Match 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 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- H. 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.
- I. 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.
- J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 8400.
- K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 8 feet above finished floor): Finish with PVC jacket and fitting covers.

3.3 SCHEDULES

A. Plumbing Systems:

- 1. Domestic Cold Water Supply:
 - a. Flexible Elastomeric Cellular Insulation:
 - 1) Thickness: 1 inch.
 - 2) Closed Cell type, inherent vapor barrier.
 - b. Glass Fiber Preformed Pipe Insulation:
 - 1) Thickness: 1 inch.
 - 2) Vapor Retarder Required: Yes.
- 2. Domestic Hot Water Supply:
 - a. Glass Fiber Preformed Pipe Insulation:
 - 1) Thickness: 1 inch.
 - 2) Vapor Retarder Required: Yes.
- 3. Domestic Hot Water Recirculation:
 - a. Glass Fiber Preformed Pipe Insulation:
 - 1) Thickness: 1 inch.
 - 2) Vapor Retarder Required: Yes.
- 4. Service: Storm Water Piping (including roof drains) Above Grade:
 - a. Operating Temperature: -30 to 100 deg F.
 - b. Insulation Material:
 - 1) Mineral-fiber preformed pipe.
 - 2) Flexible Elastomeric Cellular preformed pipe.
 - c. Insulation Thickness: Apply the following insulation thicknesses:
 - 1) All Pipe Sizes, 1" thick.
 - d. Vapor Retarder Required: Yes.
- 5. Plumbing Vents Within 10 Feet of the Exterior:
 - a. Insulation Thickness: 1" thick all pipe sizes.
 - b. Operating Temperature: 35 to 140 deg F (2 to 60 deg C).
 - c. Insulation Material: Mineral-fiber preformed pipe.
 - d. Vapor Retarder Required: Yes.

END OF SECTION 22 0719

SECTION 22 1005 - PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sanitary waste piping, buried within 5 feet of building.
- B. Sanitary waste piping, above grade.
- C. Domestic water piping, buried within 5 feet of building.
- D. Domestic water piping, above grade.
- E. Storm drainage piping, buried within 5 feet of building.
- F. Storm drainage piping, above grade.
- G. Pipe flanges, unions, and couplings.
- H. Pipe hangers and supports.

1.2 RELATED REQUIREMENTS

- A. Section 22 0516 - Expansion Fittings and Loops for Plumbing Piping.
- B. Section 22 0553 - Identification for Plumbing Piping and Equipment.
- C. Section 22 0719 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- C. ASME B16.51 - Copper and Copper Alloy Press-Connect Pressure Fittings; 2021.
- D. ASME B31.9 - Building Services Piping; 2025.
- E. ASTM B32 - Standard Specification for Solder Metal; 2020.
- F. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- G. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- H. ASTM B813 - Standard Specification for Water Flushable Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2024.
- I. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2023.

- J. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2026.
- K. ASTM C1540 - Standard Specification for Heavy-Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings; 2020.
- L. ASTM D2239 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter; 2025.
- M. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020 (Reapproved 2024).
- N. ASTM D2609 - Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe; 2024.
- O. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2025.
- P. ASTM D2846/D2846M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems; 2024.
- Q. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020 (Reapproved 2024).
- R. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2024, with Editorial Revision (2025).
- S. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- T. ASTM F441/F441M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80; 2023.
- U. ASTM F442/F442M - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR); 2023.
- V. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2023.
- W. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; 2023.
- X. AWWA C651 - Disinfecting Water Mains; 2023.
- Y. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2021.
- Z. 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; 2020.
- AA. FM 1680 - Examination Standard for Couplings Used in Hubless Cast Iron Systems for Drain, Waste or Vent, Sewer, Rainwater or Storm Drain Systems Above and Below Ground, Industrial/ Commercial and Residential; 2025.
- BB. IAPMO (UPC) - Uniform Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- CC. IAPMO/ANSI/CAN Z1117 - Standard for Press Connections; 2022.
- DD. ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- EE. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2025.
- FF. NSF 61 - Drinking Water System Components - Health Effects; 2025, with Addendum
- GG. NSF 372 - Drinking Water System Components - Lead Content; 2024.
- HH. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - 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. Project Record Documents: Record actual locations of valves.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements for additional provisions.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. 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, solder, and flux (if used), complying with NSF 61 and NSF 372; label pipe and fittings.
- B. Plenum-Installed Piping: Provide piping with flame spread index of 25 or less and smoke developed index of 50 or less when tested in accordance with ASTM E84 or UL 723.
- C. PVC Storm, Drain, Waste & Vent Pipe installed in Return Air Plenum:
 - 1. PVC shall not be allowed for installation above ceilings within Return Air Plenums, unless steps are taken by the installing contractor for PVC to meet or exceed the flame/smoke spread rating as indicated in Section 703.5 of the International Building Code or such materials shall have a flame spread index of not more than 25 and smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

2.2 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Epoxy Coated Cast Iron Pipe (in Laundry and Kitchen area where higher temperatures are expected: CISPI 301, hubless.
 - 1. Fittings: Cast iron.
 - 2. Joints: CISPI 310, neoprene gasket and stainless steel clamp and shield assemblies.
- B. CPVC Pipe (in Laundry and Kitchen area where higher temperatures are expected: ASTM D2846/D2846M, ASTM F441/F441M, or ASTM F442/F442M.
 - 1. Fittings: CPVC; ASTM D2846/D2846M, ASTM F437, ASTM F438, or ASTM F439.
 - 2. Joints: ASTM D2846/D2846M, solvent weld with ASTM F493 solvent cement.
- C. Schedule 40 PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY WASTE PIPING, ABOVE GRADE

- A. Epoxy Coated Cast Iron Pipe (in Laundry and Kitchen area where higher temperatures are expected: CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
- B. CPVC Pipe (in Laundry and Kitchen area where higher temperatures are expected: ASTM D2846/D2846M, ASTM F441/F441M, or ASTM F442/F442M.
 - 1. Fittings: CPVC; ASTM D2846/D2846M, ASTM F437, ASTM F438, or ASTM F439.
 - 2. Joints: ASTM D2846/D2846M, solvent weld with ASTM F493 solvent cement.
- C. PVC Pipe: ASTM D1785 Schedule 40, with not less than 150 psi pressure rating.
 - 1. Fittings: ASTM D2466, PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Copper Pipe: ASTM B88 (ASTM B88M), Type K (A), Drawn (H) for 2" and smaller.
 - 1. No joint allowed under building.
- B. Ductile Iron Pipe: AWWA C151/A21.51.
 - 1. Fittings: Ductile or gray iron, standard thickness.
 - 2. Joints: AWWA C111/A21.11, styrene butadiene rubber (SBR) or vulcanized SBR gasket with 3/4 inch diameter rods.
- C. PVC Pipe (Where allowed by Plumbing Inspector): AWWA C900-07 Polyvinyl Chloride (Pressure Pipe & Fabricated Fittings)
 - 1. Fittings: AWWA C900-07 Polyvinyl Chloride (Pressure Pipe & Fabricated Fittings)
 - 2. Joints: Bell & Spigot with factory installed elastomeric sealing gasket.
 - 3. Apply a thin layer of lubricant to the outer circumference of the pipe from bevel to approximately half-way back toward the insertion line. In addition, lube the surface area of the elastomeric sealing gasket with a brush or roller. Only use lubricant certified by NSF when installing in potable water application.
 - 4. Field cutting & beveling shall be AWWA guidelines.
 - 5. Provide thrust restraint meeting to ASTM F1674 Standard Test Method for Joint Restraint Products for Use with PVC.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Pipe: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
 - 1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
 - 2. Joints: ASTM B32 solder.
 - 3. Mechanical Press Sealed Fittings: ASME B16.51 or IAPMO/ANSI/CAN Z1117, ICC (IPC), and IAPMO (UPC) approved, NSF 61 and NSF 372 certified, with EPDM seals.

2.6 STORM DRAINAGE PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Schedule 40 PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.7 STORM DRAINAGE PIPING, ABOVE GRADE

- A. Schedule 40 PVC Pipe: ASTM D2665.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.8 PIPE FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 inch and Under:
 - 1. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
- B. Flanges for Pipe Sizes Over 3 inch:
 - 1. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

- C. Shielded, Heavy Duty No-Hub Couplings:
 - 1. Testing: In accordance with ASTM C1540 and FM 1680.
 - 2. Gasket Material: Neoprene complying with ASTM C564.
 - 3. Band Material: Stainless steel.
 - 4. Eyelet Material: Stainless steel.
 - 5. Manufacturers:
 - a. Ideal Clamp Products, Inc; Green Shield Super Heavy Duty: www.idealtridon.com/#sle.
 - b. MIFAB, Inc: www.mifab.com/#sle.
 - c. ANACO-Husky.
 - d. Fernco Inc.
 - e. Tyler Pipe.
 - f. Ideal
- D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.9 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.
- B. Plumbing Piping - Drain, Waste, and Vent:
 - 1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 - 2. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 - 3. Wall Support for Pipe Sizes to 3 inch: Cast iron hook.
 - 4. Wall Support for Pipe Sizes 4 inch 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. Provide oversize hangers on insulated pipe to allow insulation at full thickness to be provided on the piping.
 - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
 - 3. Hangers for Cold Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 - 4. Hangers for Hot Pipe Sizes 2 to 4 inch: Carbon steel, adjustable, clevis.
 - 5. Hangers for Hot Pipe Sizes 6 inch and Larger: Adjustable steel yoke, cast iron pipe roll, double hanger.
 - 6. Wall Support for Pipe Sizes Up to 3 inch: Cast iron hook.
 - 7. Wall Support for Pipe Sizes 4 inch and Larger: Welded steel bracket and wrought steel clamp.

8. Wall Support for Hot Pipe Sizes 6 inch and Larger: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.
9. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
10. Floor Support for Hot Pipe Sizes to 4 inch: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
11. Floor Support for Hot Pipe Sizes 6 inch and Larger: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.
12. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

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.
- 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. See Section 22 0516.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- H. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.
- I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.
- J. Provide support for utility meters in accordance with requirements of utility companies.
- K. Install bell and spigot pipe with bell end upstream.
- L. Install valves with stems upright or horizontal, not inverted. See Section 22 0523.

- M. Install water piping to ASME B31.9.
- N. 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.
- O. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- 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.
 - 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.
 - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.
- Q. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.9.
 - 2. Provide oversize hangers on insulated pipe to allow insulation at full thickness to be provided on the piping.
 - 3. Support horizontal piping as required.
 - 4. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 5. Place hangers within 12 inches of each horizontal elbow.
 - 6. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 7. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 - 8. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - 9. Provide copper plated hangers and supports for copper piping.
 - 10. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
 - 11. Support cast iron drainage piping at every joint.
- R. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.4 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 flow controls in water recirculating systems where indicated.

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 for pipe 3" and smaller. Slope to drain at minimum of 1/8" per foot (1:100) slope for pipe 4" and larger.
- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.6 FIELD TESTS AND INSPECTIONS

- A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.
- B. Domestic Water Systems:
 - 1. Perform hydrostatic testing for leakage prior to system disinfection.
 - 2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
 - 3. General:
 - a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.
- C. Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.7 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed, and clean.
- B. Disinfect water distribution system in accordance with Plumbing Code.
- C. 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.

3.8 SERVICE CONNECTIONS

- A. Provide new sanitary and storm sewer services. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- B. Provide new water service complete with approved reduced pressure backflow preventer and water meter with by-pass valves, pressure reducing valve, and sand strainer (refer to details on plans for items required specific to project).

END OF SECTION 22 1005

SECTION 22 1500 - GENERAL-SERVICE COMPRESSED-AIR SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. System filters.
- B. Pipe and fittings.
- C. Unions and couplings.

1.2 RELATED REQUIREMENTS

- A. Section 22 0523 - General-Duty Valves for Plumbing Piping.

1.3 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- C. ASME B31.1 - Power Piping; 2024.
- D. ASTM B32 - Standard Specification for Solder Metal; 2020.
- E. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- F. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturers catalog literature with capacity, weight, and electrical characteristics and connection requirements.

1.5 QUALITY ASSURANCE

PART 2 PRODUCTS

2.1 SYSTEM FILTERS

- A. Manufacturers:
 - 1. Atlas Copco USA.
 - 2. Parker.
- B. Cartridge Number 1: As indicated on drawings.

- C. Location: As indicated on drawings.
- D. Flow Capacity: Match compressor rate.

2.2 PIPE AND FITTINGS

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L, drawn temper.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, solder, Grade Sn95.

2.3 UNIONS AND COUPLINGS

- A. Unions:
 - 1. Copper Tube and Pipe: 150 psi bronze unions with soldered joints.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Install valved drip connections at low points of piping system. See Section 22 0523.

3.2 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping in accordance with ASME B31.1.
- C. Repair or replace compressed air piping as required to eliminate leaks, and retest to demonstrate compliance.
- D. Cap and seal ends of piping when not connected to mechanical equipment.

END OF SECTION 22 1500

SECTION 22 4000 - PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sinks.

1.2 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2008 (Reaffirmed 2013).
- C. ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
- D. ASME A112.18.1 - Plumbing Supply Fittings; 2024.
- E. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2022).
- F. ASME A112.19.1 - Enamelled Cast Iron and Enamelled Steel Plumbing Fixtures; 2024.
- G. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2024.
- H. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2022.
- I. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2022.
- J. ASSE 1016 - Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations; 2017 (Reaffirmed 2021).
- K. ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.
- L. IAPMO Z124 - Plastic Plumbing Fixtures; 2022, with Editorial Revision.
- M. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- N. NSF 61 - Drinking Water System Components - Health Effects; 2025, with Addendum
- O. NSF 372 - Drinking Water System Components - Lead Content; 2024.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

- B. Maximum Fixture or Faucet Supply Pressure: 60 psi unless stated otherwise.

2.2 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for installation of plumbing systems.
- B. Perform work in accordance with local health department regulations.

2.3 SINKS

- A. Single Compartment Bowl
 - 1. ASME A112.19.3; outside dimensions, 18 gauge, 0.050 inch thick, type 304 stainless steel, self-rimming and undercoated, with ledge back drilled for trim.
 - 2. Drain: 1-1/2 inch stainless steel.
 - 3. Drain: 3-1/2 inch crumb cup and tailpiece.
- B. Lab Faucets:
 - 1. Manufacturers:
 - a. American Standard, Inc.
 - b. Zurn.
 - c. PROFLO
 - d. Chicago Faucet Company.
 - 2. Two-Handle Faucet:
 - a. Type: Deck-mount, lever operated, high-arc, swivel faucet with mounting plate.
 - b. Spray Type: Full stream spray at 2.2 gpm, maximum.
 - c. ASME A112.18.1, ADA Standards, and NSF 61 compliant assembly.
 - d. Materials: Stainless steel disc valve on brass body with polished chrome finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome-plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.
- C. Install components level and plumb.

- D. Install and secure fixtures in place with wall supports and bolts.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

- A. Clean plumbing fixtures and equipment.

3.7 SCHEDULES

- A. Fixture Heights: Install fixtures to heights above finished floor as indicated.

1. Water Closet:
 - a. Standard: 15 inches to top of bowl rim.
 - b. Accessible: 18 inches to top of seat.
2. Urinal:
 - a. Standard: 22 inches to top of bowl rim.
 - b. Accessible: 17 inches to top of bowl rim.
3. Lavatory:
 - a. Standard: 31 inches to top of basin rim.
 - b. Accessible: 34 inches to top of basin rim.
4. Drinking Fountain:
 - a. Child: 30 inches to top of basin rim.
 - b. Standard Adult: 40 inches to top of basin rim.
 - c. Accessible: 36 inches to top of spout.

- B. Fixture Rough-In

1. Water Closet (Flush Valve Type):
 - a. Cold Water: 1 Inch.
 - b. Waste: 4 Inch.
 - c. Vent: 2 Inch.
2. Water Closet (Tank Type):
 - a. Cold Water: 1/2 Inch.
 - b. Waste: 4 Inch.
 - c. Vent: 2 Inch.
3. Urinal (Flush Valve Type):
 - a. Cold Water: 3/4 Inch.
 - b. Waste: 2 Inch.
 - c. Vent: 1-1/2 Inch.
4. Lavatory:
 - a. Hot Water: 1/2 Inch.

- b. Cold Water: 1/2 Inch.
- 5. Sink:
 - a. Hot Water: 1/2 Inch.
 - b. Cold Water: 1/2 Inch.
- 6. Service Sink:
 - a. Waste: 2 Inch.
 - b. Vent: 1-1/2 Inch.
- 7. Mop Sink:
 - a. Hot Water: 3/4 Inch.
 - b. Cold Water: 3/4 Inch.
 - c. Waste: 3 Inch.
 - d. Vent: 2 Inch.
- 8. Drinking Fountain:
 - a. Cold Water: 1/2 Inch.
- 9. Bathtub:
 - a. Hot Water: 1/2 Inch.
 - b. Cold Water: 1/2 Inch.
- 10. Shower:
 - a. Hot Water: 1/2 Inch.
 - b. Cold Water: 1/2 Inch.

END OF SECTION 22 4000

SECTION 23 0130.51 - HVAC AIR-DISTRIBUTION SYSTEM CLEANING

PART 1 GENERAL

1.1 DEFINITIONS

- A. HVAC System: For purposes of this section, the surfaces to be cleaned include all interior surfaces of the heating, air-conditioning and ventilation system from the points where the air enters the system to the points where the air is discharged from the system, including the inside of air distribution equipment, coils, and condensate drain pans; see NADCA ACR for more details.
 - 1. Underfloor plenum for return air is required to be cleaned.

1.2 REFERENCE STANDARDS

- A. NADCA ACR - The NADCA Standard for Assessment, Cleaning, and Restoration of HVAC Systems; 2025.
- B. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.
- C. UL 181A - Closure Systems for Use with Rigid Air Ducts; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.1 TOOLS AND EQUIPMENT

- A. Vacuum Devices and Other Tools: Exceptionally clean, in good working order, and sealed when brought into the facility.
- B. Vacuum Devices That Exhaust Air Inside Building, Including Hand-Held and Wet Vacuums: Equipped with HEPA filtration with 99.97 percent collection efficiency for minimum 0.3-micron size particles and DOP test number.
- C. Vacuum Devices That Exhaust Air Outside Building, Including Truck- and Trailer-Mounted Types: Equipped with particulate collection including adequate filtration to contain debris removed from the HVAC system; exhausted in manner that prevents contaminant re-entry to building; compliant with applicable regulations as to outdoor environmental contamination.

PART 3 EXECUTION

3.1 PROJECT CONDITIONS

- A. Comply with applicable federal, state, and local requirements.

- B. Perform cleaning, inspection, and remediation in accordance with the recommendations of NADCA "Assessment, Cleaning and Restoration of HVAC Systems" (ACR) and as specified herein.
- C. Where NADCA ACR uses the terms "recommended", "highly recommended", or "ideally" in regard to a certain procedure or activity, do that unless it is clearly inapplicable to the project.
- D. Obtain Owner's approval of proposed temporary locations for large equipment.
- E. Designate a decontamination area and obtain Owner's approval.
- F. If unforeseen mold or other biological contamination is encountered, notify Architect immediately, identifying areas affected and extent and type of contamination.

3.2 PREPARATION

- A. When cleaning work might adversely affect life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with authorities having jurisdiction.
- B. Ensure that electrical components that might be adversely affected by cleaning are de-energized, locked out, and protected prior to beginning work.
- C. Air-Volume Control Devices: Mark the original position of dampers and other air-directional mechanical devices inside the HVAC system prior to starting cleaning.
- D. Access to Concealed Spaces: Use existing service openings and make additional service openings as required to accomplish cleaning and inspection.
 - 1. Do not cut openings in non-HVAC components without obtaining the prior approval of Owner.
 - 2. Make new openings in HVAC components in accordance with NADCA Standard 05; do not compromise the structural integrity of the system.
 - 3. Do not cut service openings into flexible duct; disconnect at ends for cleaning and inspection.
- E. Ceiling Tile: Lay-in ceiling tile may be removed to gain access to HVAC systems during the cleaning process; protect tile from damage and reinstall upon completion; replace damaged tile.

3.3 CLEANING

- A. Use any cleaning method recommended by NADCA ACR unless otherwise specified; do not use methods prohibited by NADCA ACR, or that will damage HVAC components or other work, or that will significantly alter the integrity of the system.
- B. Obtain Owner's approval before using wet cleaning methods; ensure that drainage is adequate before beginning.
- C. Ducts: Mechanically clean all portions of ducts.
- D. Hoses, Cables, and Extension Rods: Clean using suitable sanitary damp wipes at the time they are being removed or withdrawn from their normal position.

- E. Registers, Diffusers, and Grilles: When removing, take care to prevent containment exposure due to accumulated debris.
- F. Coils: Follow NADCA ACR completely including measuring static pressure drop before and after cleaning; do not remove refrigeration coils from system to clean; report coils that are permanently impacted.
- G. Collect debris removed during cleaning; ensure that debris is not dispersed outside the HVAC system during the cleaning process.
- H. Store contaminated tools and equipment in polyethylene bags until cleaned in the designated decontamination area.

3.4 REPAIR

- A. Repair openings cut in the ventilation system so that they do not significantly alter the airflow or adversely impact the facility's indoor air quality.
- B. At insulated ducts and components, accomplish repairs in such a manner as to achieve the equivalent thermal value.
- C. Reseal new openings in accordance with NADCA Standard 05.
- D. Reseal rigid fiber glass duct systems using closure techniques that comply with UL 181 or UL 181A.
- E. When new openings are intended to be capable of being re-opened in the future, clearly mark them and report their locations to Owner in project report documents.

3.5 FIELD QUALITY CONTROL

- A. Ensure that the following field quality control activities are completed prior to application of any treatments or coatings and prior to returning HVAC system to normal operation.
- B. Visually inspect all portions of the cleaned components; if not visibly clean as defined in NADCA ACR, re-clean and reinspect.
- C. Coils: Cleaning must restore the coil pressure drop to within 10 percent of the coil's original installed pressure drop; if original pressure drop is not known, coil will be considered clean if free of foreign matter and chemical residue based on visual inspection.
- D. Notify Architect when cleaned components are ready for inspection.
- E. When directed, re-clean components until they pass.
- F. Submit evidence that all portions of the system required to be cleaned have been cleaned satisfactorily.

3.6 ADJUSTING

- A. After satisfactory completion of field quality control activities, restore adjustable devices to original settings, including, but not limited to, dampers, air directional devices, valves, fuses, and circuit breakers.

3.7 WASTE MANAGEMENT

- A. Double-bag waste and debris in 6 mil, 0.006 inch thick polyethylene plastic bags.
- B. Dispose of debris off-site in accordance with applicable federal, state and local requirements.

END OF SECTION 23 0130.51

SECTION 23 0517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe sleeves.
- B. Pipe-sleeve seals.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 23 0719 - HVAC Piping Insulation.

1.3 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2024.
- B. FM (AG) - FM Approval Guide; Current Edition.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.

1.5 QUALITY ASSURANCE

- A. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.
- B. Provide temporary protective coating on cast iron and steel sleeves if shipped loose.

1.7 WARRANTY

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

PART 2 PRODUCTS

2.1 PIPE SLEEVES

- A. Vertical Piping:
 - 1. Sleeve Length: 2 inch (50 mm) above finished floor.
 - 2. Provide sealant for watertight joint.
 - 3. Blocked Out Floor Openings: Provide 1-1/2 inch angle set in silicon adhesive around opening.
- B. Pipe Passing Through Below Grade Exterior Walls:
 - 1. Galvanized pipe.
 - 2. Provide watertight space with link rubber or modular seal between sleeve and pipe on both pipe ends.
- C. Clearances:
 - 1. Provide allowance for insulated piping.
 - 2. Wall, Floor, Partitions, and Beam Flanges: 1 inch greater than external pipe diameter.
 - 3. All Rated Openings: Caulked tight with fire stopping material in compliance with ASTM E814 in accordance with Section 07 8400 to prevent the spread of fire, smoke, and gases.

2.2 PIPE-SLEEVE SEALS

- A. Manufacturers:
 - 1. Advance Products & Systems, LLC.
 - 2. American Polywater Corporation.
 - 3. Flexicraft Industries.
 - 4. Link-Seal
 - 5. Metraflex Company (The)
 - 6. Pipeline Seal and Insulator, Inc
- B. Modular Mechanical Sleeve-Seal:
 - 1. Elastomer-based interlocking links continuously fill annular space between pipe and wall-sleeve, wall or casing opening.
 - 2. Watertight seal between pipe and wall-sleeve, wall or casing opening.
 - 3. Size and select seal component materials in accordance with service requirements.
 - 4. Service Requirements:
 - a. Corrosion resistant.
 - b. Underground, buried, and wet conditions.
 - 5. Stainless Steel pressure end plates.
- C. Pipe Sleeve Material:
 - 1. Bearing Walls: Galvanized Steel
 - 2. Masonry Structures: Galvanized Steel

2.3 GROUT

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

3.2 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- B. Install piping to conserve building space, to not interfere with use of space and other work.
- C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
 - 1. All Rated Openings: Caulk tight with fire stopping material in compliance with ASTM E814 in accordance with Section 07 8400 to prevent the spread of fire, smoke, and gases.
- E. Manufactured Sleeve-Seal Systems:
 - 1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
 - 2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
 - 3. Locate piping in center of sleeve or penetration.
 - 4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
 - 5. Tighten bolting for a water-tight seal.
 - 6. Install in accordance with manufacturer's recommendations.
- F. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- G. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system

3.3 CLEANING

- A. Upon completion of work, clean all parts of the installation.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

3.4 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Exterior Concrete Walls above Grade:
 - a. Piping Smaller Than NPS 6 Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 and Larger: Galvanized-steel wall sleeves.
 - 2. Exterior Concrete Walls below Grade:
 - a. Piping Smaller Than NPS 6 Galvanized-steel-pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 and Larger: Galvanized-steel wall sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 3. Concrete Slabs-on-Grade:
 - a. Piping Smaller Than NPS 6 Galvanized-steel-pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 4. Concrete Slabs above Grade:
 - a. Piping Smaller Than NPS 6 Galvanized-steel-pipe sleeves
 - b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves.
 - 5. Interior Partitions:
 - a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
 - b. Piping NPS 6 and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION 23 0517

SECTION 23 0519 - METERS AND GAUGES FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flow meters.
- B. Pressure gauges and pressure gauge taps.
- C. Thermometers and thermometer wells.
- D. Static pressure gauges.
- E. Filter gauges.

1.2 RELATED REQUIREMENTS

- A. Section 23 0923 - Direct-Digital Control System for HVAC.
- B. Section 23 2113 - Hydronic Piping.
- C. Section 23 2213 - Steam and Condensate Heating Piping.

1.3 REFERENCE STANDARDS

- A. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2022.
- B. ASME MFC-3M - Measurement of Fluid Flow in Pipes Using Orifice, Nozzle, and Venturi; 2004 (Reaffirmed 2025).
- C. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014 (Reapproved 2025).
- D. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014 (Reapproved 2021).
- E. AWWA M6 - Water Meters -- Selection, Installation, Testing, and Maintenance; 2026.
- F. UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

1.5 FIELD CONDITIONS

- A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2 PRODUCTS

2.1 LIQUID FLOW METERS

- A. Manufacturers:
 - 1. Flow Design
 - 2. Gerand Engineering Co.
 - 3. Griswold
 - 4. Tour Anderson
 - 5. Pro Hydronics
 - 6. Nexus
- B. Description: Flowmeter with calibrated flow-measuring element, hoses or tubing, fittings, valves, indicator, and conversion chart.
- C. Flow Range: Sensor and indicator shall cover operating range of equipment or system served.
- D. Sensor: Venturi-type, calibrated, flow-measuring element; for installation in piping.
 - 1. Design: Differential-pressure-type measurement for water or water glycol mixture.
 - 2. Construction: Bronze, brass, or factory-primed steel, with brass fittings and attached tag with flow conversion data.
 - 3. Minimum Pressure Rating: 250 psig.
 - 4. Minimum Temperature Rating: 250 deg F
 - 5. End Connections for NPS 2 and Smaller: Threaded.
 - 6. End Connections for NPS 2-1/2 and Larger: Flanged or welded.
 - 7. Flow Range: Flow-measuring element and flowmeter shall cover operating range of equipment or system served.
- E. Operating Instructions: Include complete instructions with each flowmeter.
- F. Calibrated ASME MFC-3M Venturi orifice plate and flanges with valved taps, chart for conversion of differential pressure readings to flow rate, with pressure gauge in case.

2.2 PRESSURE GAUGES

- A. Manufacturers:
 - 1. Ametek, Inc
 - 2. Flo Fab Inc
 - 3. Tel-Tru Manufacturing Company
 - 4. Trerice
 - 5. Watts
 - 6. Weiss Instruments, Inc
 - 7. Wika Instrument Corporation - USA
 - 8. Winters Instruments - US

- B. Pressure Gauges: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
1. Case: Cast Aluminum or drawn steel.
 2. Size: Minimum 4-1/2 inch diameter.
 3. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
 4. Provide liquid filled gauges for inlet and outlet of hydronic circulating pumps.
 5. Movement: Mechanical, with link to pressure element and connection to pointer.
 6. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi.
 7. Pointer: Dark-colored metal.
 8. Window: Glass or plastic.
 9. Ring: Metal.
 10. Mid-Scale Accuracy: One percent.
 11. Scale: Psi and KPa. Range shall be suitable for the system pressure range. Provide compound gauges capable of reading both vacuum and pressure where needed.

2.3 PRESSURE GAUGE TAPPINGS

- A. Gauge Cock: Tee or lever handle, brass for maximum 150 psi.
- B. Needle Valve: Brass, 1/4 inch NPT for minimum 150 psi.
- C. Pulsation Damper: Pressure snubber, brass with 1/4 inch connections.
- D. Syphon: Steel, Schedule 40, 1/4 inch angle or straight pattern.

2.4 STEM TYPE THERMOMETERS

- A. Manufacturers:
1. Flo Fab Inc.
 2. Tel-Tru Manufacturing Company.
 3. [Trerice](#)
 4. Watts
 5. Weiss Instruments, Inc.
 6. Wika Instrument Corporation - USA.
 7. Winters Instruments - U.S.
- B. Thermometers - Adjustable Angle: Red- or blue-appearing non-toxic liquid in glass; ASTM E1; lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device; adjustable 360 degrees in horizontal plane, 180 degrees in vertical plane.
1. Size: 9 inch scale.
 2. Window: Clear Lexan.
 3. Stem: Aluminum or brass and of length to suit installation.
 - a. Design for Air-Duct Installation: With ventilated shroud.
 - b. Design for Thermowell Installation: Bare stem.
 4. Accuracy: 2 percent, per ASTM E77.
 5. Calibration: Degrees F.

2.5 THERMOMETER SUPPORTS

- A. Socket: Brass or stainless steel separable sockets for thermometer stems with or without extensions as required, and with cap and chain.
- B. Flange: 3 inch outside diameter reversible flange, designed to fasten to sheet metal air ducts, with brass perforated stem.

2.6 TEST PLUGS

- A. Test Plug: 1/4 inch or 1/2 inch brass fitting and cap for receiving 1/8 inch outside diameter pressure or temperature probe with neoprene core for temperatures up to 200 degrees F.

2.7 STATIC PRESSURE GAUGES

- A. 3-1/2 inch diameter dial in metal case, diaphragm actuated, black figures on white background, front recalibration adjustment, 2 percent of full scale accuracy.
- B. Inclined manometer, red liquid on white background with black figures, front recalibration adjustment, 3 percent of full scale accuracy.
- C. Accessories: Static pressure tips with compression fittings for bulkhead mounting, 1/4 inch diameter tubing.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install positive displacement meters with isolating valves on inlet and outlet to AWWA M6. Provide full line size valved bypass with globe valve for liquid service meters.
- C. Provide one pressure gauge per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gauge.
- D. Install pressure gauges with pulsation dampers. Provide gauge cock to isolate each gauge. Provide siphon on gauges in steam systems. Extend nipples and siphons to allow clearance from insulation.
- E. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Ensure sockets allow clearance from insulation.
- F. Install thermometers in air duct systems on flanges.
- G. Install thermometer sockets adjacent to controls system thermostat, transmitter, or sensor sockets. Refer to Section 23 0943. Where thermometers are provided on local panels, duct or pipe mounted thermometers are not required.
- H. Locate duct mounted thermometers minimum 10 feet downstream of mixing dampers, coils, or other devices causing air turbulence.

- I. Coil and conceal excess capillary on remote element instruments.
- J. Provide instruments with scale ranges selected according to service with largest appropriate scale.
- K. Install gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
- L. Adjust gauges and thermometers to final angle, clean windows and lenses, and calibrate to zero.
- M. Locate test plugs adjacent thermometers and thermometer sockets.
- N. Install thermometers in the following locations:
 - 1. Inlet and outlet of each hydronic zone.
 - 2. Inlet and outlet of each hydronic boiler.
 - 3. Two inlets and two outlets of each chiller.
 - 4. Inlet and outlet of each hydronic coil in air-handling units.
 - 5. Two inlets and two outlets of each hydronic heat exchanger.
 - 6. Inlet and outlet of each thermal-storage tank.
 - 7. Outside-, return-, supply-, and mixed-air ducts.
- O. Install pressure gages in the following locations:
 - 1. Discharge of each pressure-reducing valve.
 - 2. Inlet and outlet of each chiller chilled-water and condenser-water connection.
 - 3. Suction and discharge of each pump.

3.2 CONNECTIONS

- A. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.
- B. Connect flowmeter-system elements to meters.
- C. Connect flowmeter transmitters to meters.
- D. Connect thermal-energy meter transmitters to meters.

3.3 ADJUSTING

- A. After installation, calibrate meters according to manufacturer's written instructions.
- B. Adjust faces of meters and gages to proper angle for best visibility.
- C. THERMOMETER SCHEDULE
- D. Thermometers at inlet and outlet of each hydronic zone shall be one of the following:
 - E. Sealed, bimetallic-actuated type.
 - F. Industrial-style, liquid-in-glass type.
 - G. Thermometers at inlet and outlet of each hydronic boiler shall be one of the following:
 - 1. Sealed, bimetallic-actuated type.

- 2. Industrial-style, liquid-in-glass type.
- H. Thermometers at inlets and outlets of each chiller shall be one of the following:
 - 1. Sealed, bimetallic-actuated type.
 - 2. Industrial-style, liquid-in-glass type.
- I. Thermometers at inlet and outlet of each hydronic coil in air-handling units and built-up central systems shall be one of the following:
 - 1. Sealed, bimetallic-actuated type.
 - 2. Industrial-style, liquid-in-glass type.
- J. Thermometers at inlets and outlets of each hydronic heat exchanger shall be one of the following:
 - 1. Sealed, bimetallic-actuated type.
 - 2. Industrial-style, liquid-in-glass type.
- K. Thermometers at inlet and outlet of each hydronic heat-recovery unit shall be one of the following:
 - 1. Sealed, bimetallic-actuated type.
 - 2. Industrial-style, liquid-in-glass type.
- L. Thermometers at inlet and outlet of each thermal-storage tank shall be one of the following:
 - 1. Sealed, bimetallic-actuated type.
 - 2. Industrial-style, liquid-in-glass type.
- M. Thermometers at outside-, return-, supply-, and mixed-air ducts shall be one of the following:
 - 1. Sealed, bimetallic-actuated type.
 - 2. Industrial-style, liquid-in-glass type.
- N. Thermometers at inlet and outlet of each domestic water heater shall be one of the following:
 - 1. Sealed, bimetallic-actuated type.
 - 2. Industrial-style, liquid-in-glass type.
- O. Thermometer stems shall be of length to match thermowell insertion length.

3.4 THERMOMETER SCALE-RANGE SCHEDULE

- A. Scale Range for Chilled-Water Piping: 0 to 100 deg F.
- B. Scale Range for Heating, Hot-Water Piping: 30 to 240 deg F.
- C. Scale Range for Steam and Steam-Condensate Piping: 0 to 250 deg F.
- D. Scale Range for Air Ducts: Minus 40 to plus 110 deg F.
- E. Scale Range for Heat Pump Piping: 0 to plus 160 deg F. (Minus 20 to plus 100 deg C).
- F. Scale Range for Domestic Cold Water Piping: 0 to 100 deg F. (Minus 20 to plus 50 deg C).
- G. Scale Range for Domestic Hot Water Piping: 0 to 250 deg F. (Minus 20 to plus 150 deg C).

3.5 PRESSURE-GAGE SCHEDULE

- A. Pressure gages at discharge of each pressure-reducing valve shall be one of the following:
 - 1. Sealed, direct mounted, metal case.
- B. Pressure gages at inlet and outlet of each chiller chilled-water and condenser-water connection shall be one of the following:
 - 1. Sealed, remote-mounted, metal case.
- C. Pressure gages at suction and discharge of each pump shall be one of the following:
 - 1. Sealed, liquid filled, direct-mounted, metal case.
- D. Pressure gages at discharge of each water service into the building at water meter shall be one of the following:
 - 1. Sealed, direct-mounted, metal case.

3.6 PRESSURE-GAGE SCALE-RANGE SCHEDULE

- A. Scale Range for Water Piping: 1.5 times standard working pressure.
- B. Scale Range for Steam Piping: 1.5 times standard working pressure.

3.7 FLOWMETER SCHEDULE

- A. Flowmeters for Water Piping: Venturi type.

END OF SECTION 23 0519

SECTION 23 0523 - GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Globe valves.
- B. Ball valves.
- C. Butterfly valves.
- D. Check valves.
- E. Gate valves.
- F. Chainwheels.

1.2 RELATED REQUIREMENTS

- A. Section 23 0553 - Identification for HVAC Piping and Equipment.
- B. Section 23 0719 - HVAC Piping Insulation.
- C. Section 23 2113 - Hydronic Piping.
- D. Section 23 2213 - Steam and Condensate Heating Piping.

1.3 ABBREVIATIONS AND ACRONYMS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. PTFE: Polytetrafluoroethylene.
- G. RS: Rising stem.
- H. TFE: Tetrafluoroethylene.
- I. WOG: Water, oil, and gas.

1.4 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; 2026.
- C. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 Metric/Inch Standard; 2025.
- D. ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves; 2022, with Errata (2023).
- E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- F. ASME B16.34 - Valves — Flanged, Threaded, and Welding End; 2025.
- G. ASME B31.9 - Building Services Piping; 2025.
- H. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings; 2004 (Reapproved 2023).
- I. ASTM A536 - Standard Specification for Ductile Iron Castings; 2024.
- J. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings; 2017 (Reapproved 2025).
- K. AWWA C606 - Grooved and Shouldered Joints; 2022.
- L. MSS SP-67 - Butterfly Valves; 2022.
- M. MSS SP-70 - Gray Iron Gate Valves, Flanged and Threaded Ends; 2011.
- N. MSS SP-71 - Gray Iron Swing Check Valves, Flanged and Threaded Ends; 2018.
- O. MSS SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Service; 2010a.
- P. MSS SP-80 - Bronze Gate, Globe, Angle, and Check Valves; 2019.
- Q. MSS SP-85 - Gray Iron Globe and Angle Valves, Flanged and Threaded Ends; 2011.
- R. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .

1.5 SUBMITTALS

- A. See Section 01 3000 - 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.

1.6 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. 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. Listed pipe sizes shown using nominal pipe sizes (NPS) and nominal diameter (DN).
- B. Provide the following valves for the applications if not indicated on drawings:
 - 1. Throttling (Hydronic): Butterfly, Ball, and Globe.
 - 2. Isolation (Shutoff): Butterfly, Gate, and Ball.
 - 3. Swing Check (Pump Outlet):
 - a. Size 2 inch and Smaller: Bronze with bronze disc.
 - b. Size 2-1/2 inch and Larger: Iron with lever and weight, lever and spring, center-guided metal, or center-guided with resilient seat.
- C. Substitutions of valves with higher CWP classes or WSP ratings for same valve types are permitted when specified CWP ratings or WSP classes are not available.

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. Gear Actuator: Quarter-turn valves 8 inch and larger.
 - 2. Handwheel: Valves other than quarter-turn types.
 - 3. Hand Lever: Quarter-turn valves 6 inch and smaller.
 - 4. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator, of size and with chain for mounting height, as indicated in the "Valve Installation" Article.
- D. Valves in Insulated Piping: Provide 2 inch 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.
 - 4. Memory Stops: Fully adjustable after insulation is installed.
- E. Memory Stops: Fully adjustable after insulation is installed.
- F. 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 inch through 24 inch: ASME B16.5.
 - 4. Solder Joint Connections: ASME B16.18.

5. Grooved End Connections: AWWA C606.

G. 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.

H. Bronze Valves:

1. Fabricate from dezincification resistant material.
2. Copper alloys containing more than 15 percent zinc are not permitted.

2.3 BRONZE, GLOBE VALVES

A. CWP Rating: Class 125: 200 psi:

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.
5. Packing: Asbestos free.
6. Handwheel: Malleable iron, bronze, or aluminum..
7. Manufacturers:
 - a. Crane Co
 - b. Hammond Valve
 - c. Milwaukee Valve Company
 - d. Nibco Inc
 - e. Watts Regualtor Co
 - f. Apollo-Conbraco

2.4 IRON, GLOBE VALVES

A. CWP Ratings: Class 125: 200 psi and Class 250: 500 psi:

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.
7. Manufacturers:
 - a. [Crane Co.](#)
 - b. [Hammond Valve.](#)
 - c. [Milwaukee Valve Company.](#)
 - d. [NIBCO INC.](#)
 - e. Watts Regulator Company.
 - f. Apollo-Conbraco.

2.5 BRASS, BALL VALVES

A. Two Piece, Full Port with Stainless Steel Trim and Female Thread, Male thread, or Solder Connections:

1. Comply with MSS SP-110.

2. SWP Rating: 150 psi.
3. CWP Rating: 600 psi.
4. Vacuum Rating: 28.9 in-Hg.
5. Body: Forged brass.
6. Seats: PTFE.
7. Stem: Stainless Steel.
8. Ball: Stainless Steel, vented..
9. Manufacturers:
 - a. [Crane Co.](#)
 - b. [Hammond Valve.](#)
 - c. [Milwaukee Valve Company.](#)
 - d. [NIBCO INC.](#)
 - e. Watts Regulator Company.
 - f. Apollo-Conbraco.

2.6 BRONZE, BALL VALVES

- A. General:
 1. Fabricate from dezincification resistant material.
 2. Copper alloys containing more than 15 percent zinc are not permitted.
- B. Two Piece, Full Port with Stainless Steel Trim:
 1. Comply with MSS SP-110.
 2. WSP Rating: 150 psi.
 3. CWP Rating: 400 psi.
 4. Body: Forged bronze or dezincified-brass alloy.
 5. End Connections: Pipe thread or solder.
 6. Seats: PTFE.
 7. Stem: Stainless steel.
 8. Ball: Stainless steel, vented.
 9. Manufacturers:
 - a. [Crane Co.](#)
 - b. [Hammond Valve.](#)
 - c. [Kitz Corporation.](#)
 - d. [Milwaukee Valve Company.](#)
 - e. [NIBCO INC.](#)
 - f. Watts Regulator Company.
 - g. Apollo-Conbraco.

2.7 IRON, BALL VALVES

- A. Split Body, Full Port:
 1. Comply with MSS SP-72.
 2. CWP Rating: 200 psi.
 3. Body: ASTM A126, gray iron.
 4. Ends: Flanged.
 5. Seats: PTFE.
 6. Stem: Stainless steel.

7. Ball: Stainless steel.
8. Manufacturers:
 - a. Apollo-Conbraco.
 - b. Crane Co.
 - c. Milwaukee Valve Company
 - d. Nibco Inc

2.8 IRON, SINGLE FLANGE BUTTERFLY VALVES

- A. Lug Style; Bidirectional Dead-End Service without Use of Downstream Flange:
 1. Size: As indicated on drawings, Class 125.
 2. Comply with MSS SP-67, Type I.
 3. Lug Style, CWP Ratings:
 - a. Sizes 2 to 12 inch: 150 psi.
 - b. 250 psi Sizes 14 to 24 inch: 250 psi.
 - c. Vacuum Service: Down to 29.9 in-Hg.
 4. Body Material: ASTM A126 cast iron or ASTM A536 ductile iron.
 5. Stem: One or two-piece stainless steel.
 6. Seat: EPDM.
 7. Disc: Aluminum-bronze.
 8. Manufacturers:
 - a. Apollo-Conbraco Industries
 - b. Crane Co
 - c. Hammond Valve
 - d. Kitz Corporation
 - e. Milwaukee Valve Company
 - f. Nibco Ince
 - g. Spence Engineering Company, Inc
 - h. Watts Regulator Co

2.9 BRONZE, LIFT CHECK VALVES

- A. Class 125:
 1. Comply with MSS SP-80, Type 1, Metal Disc to Metal Seat and Type 2, Nonmetallic Disc to Metal Seat.
 2. CWP Rating: 200 psi.
 3. Design: Vertical flow.
 4. Body: Bronze.
 5. Ends: Threaded.
 6. Disc (Type 1): Bronze.
 7. Disc (Type 2): NBR or PTFE.
 8. Manufacturers:
 - a. [Crane Co](#)
 - b. [Hammond Valve.](#)
 - c. [Kitz Corporation.](#)
 - d. [Milwaukee Valve Company.](#)
 - e. [NIBCO INC.](#)
 - f. Watts Regulator Company.

- g. Apollo-Conbraco.

2.10 BRONZE, SWING CHECK VALVES

A. Class 125:

1. Pressure and Temperature Rating: MSS SP-80, Type 3.
2. Design: Y-pattern, horizontal or vertical flow.
3. CWP Rating: 200 psi.
4. Body: Bronze, ASTM B62.
5. End Connections: Threaded or soldered.
6. Disc: Bronze.
7. Manufacturers:
 - a. [Crane Co](#)
 - b. [Hammond Valve.](#)
 - c. [Kitz Corporation.](#)
 - d. [Milwaukee Valve Company.](#)
 - e. [NIBCO INC.](#)
 - f. Watts Regulator Company.
 - g. Apollo-Conbraco.

2.11 IRON, SWING CHECK VALVES WITH CLOSURE CONTROL

A. Class 125:

1. Comply with MSS SP-71, Type I.
2. Sizes 2-1/2 to 12 inch: CWP Rating; 200 psi.
3. Sizes 14 to 24 inch: CWP Rating; 150 psi.
4. Body Design: Clear or full waterway.
5. Body Material: ASTM A126, gray iron with bolted bonnet.
6. Ends: Flanged or threaded, See valve schedule
7. Trim: Bronze.
8. Gasket: Asbestos free.
9. Closer Control: Factory installed, exterior lever, and spring or weight.
10. Manufacturers:
 - a. [Crane Company.](#)
 - b. [Hammond Valve.](#)
 - c. [Milwaukee Valve Company.](#)
 - d. [NIBCO INC.](#)
 - e. Watts Regulator Company.
 - f. Apollo-Conbraco.

2.12 BRONZE, GATE VALVES

A. Nonrising Stem or NRS:

1. Pressure-Temperature Range: MSS SP-80, Type I.
2. Class 125:
 - a. CWP Rating: 200 psi.
3. Class 150: CWP Rating; 300 psi.
4. Body: ASTM B62, bronze with integral seat and screw-in bonnet.

5. Ends Connections: Threaded or solder.
6. Stem: Bronze.
7. Disc: Solid wedge; bronze.
8. Packing: Asbestos free.
9. Handwheel Operator: Malleable iron, bronze, or aluminum.
10. Manufacturers:
 - a. Apollo Valves; _____: www.apollovalves.com/#sle.
 - b. [Crane Co](#)
 - c. [Hammond Valve](#).
 - d. [Kitz Corporation](#).
 - e. [Milwaukee Valve Company](#).
 - f. [NIBCO INC](#).
 - g. Watts Regulator Co

2.13 IRON, GATE VALVES

- A. NRS or OS&Y:
 1. Comply with MSS SP-70, Type I.
 2. Class 125:
 - a. Sizes 2-1/2 to 12 inch, CWP Rating; 200 psi.
 - b. Sizes 14 to 24 inch, CWP Rating; 500 psi.
 3. Body Material: Gray iron with bolted bonnet.
 4. Ends: Flanged.
 5. Trim: Bronze.
 6. Disc: Solid wedge.
 7. Packing and Gasket: Asbestos free.
 8. Manufacturers:
 - a. Apollo Valves; _____: www.apollovalves.com/#sle.
 - b. [Crane Co](#)
 - c. [Hammond Valve](#).
 - d. [Kitz Corporation](#).
 - e. [Milwaukee Valve Company](#).
 - f. [NIBCO INC](#).
 - g. Watts Regulator Co

2.14 CHAINWHEELS

- A. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
 1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
 2. Attachment: For connection to ball and butterfly valve stems.
 3. Sprocket Rim with Chain Guides: Ductile iron include zinc coating.
 4. Chain: Hot-dip galvanized steel. Sized to fit sprocket rim.
- B. Manufacturers:
 1. [Babbitt Steam Specialty Co](#).
 2. [Roto Hammer Industries](#).
 3. [Trumbull Industries](#).

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. 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. Where valve support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welds.
- D. Install check valves where necessary to maintain direction of flow as follows:
 - 1. Lift Check: Install with stem plumb and vertical.
 - 2. Swing Check: Install horizontal maintaining hinge pin level.
 - 3. Orient plate-type and center-guided into horizontal or vertical position, between flanges.
- E. Verify with owner: Provide chainwheels on operators for valves 4 NPS and larger where located 96 inches or more above finished floor, terminating 60 inches above finished floor.

3.3 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- 1. If valve applications are not indicated, use the following:
 - 2. Shutoff Service: Ball or butterfly valves.
 - 3. Throttling Service: Globe, angle, ball or butterfly valves.
- B. Pump-Discharge Check Valves:
 - 1. NPS 2 and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
 - a. NPS 2-1/2 and Larger: Iron swing check valves with lever and weight or with spring or iron, center-guided, metal or resilient-seat check valves.
- C. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- D. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
 4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 6. For Steel Piping, NPS 5 and Larger: Flanged ends.
- E. Chilled-Water Piping: Use the following types of valves:
1. Ball Valves, NPS 2 and Smaller: Two-piece, 400-psig CWP rating, copper alloy.
 2. Butterfly Valves, NPS 2-1/2 and Larger: Single-flange, 150-psig CWP rating, ferrous alloy, with EPDM liner.
 3. Swing Check Valves, NPS 2-1/2 and Larger: Type II, Class 125, gray iron.
 4. Spring-Loaded Check Valves, NPS 2-1/2 and Larger: Type I or II, Class 125, cast iron.
- F. Heating Water Piping: Use the following types of valves:
1. Ball Valves, NPS 2 and Smaller: Two-piece, 400-psig CWP rating, copper alloy.
 2. Butterfly Valves, NPS 2-1/2 and Larger: Single Flange, 150-psig CWP rating, ferrous alloy, with EPDM liner.
 3. Check Valves, NPS 2 and Smaller: Type 2, Class 125, horizontal or vertical, bronze.
 4. Swing Check Valves, NPS 2 and Smaller: Type 4, Class 125, bronze.
 5. Swing Check Valves, NPS 2-1/2 and Larger: Type II, Class 125, gray iron.
 6. Spring-Loaded, Check Valves, NPS 2 and Smaller: Type IV, Class 125 minimum.
 7. Spring-Loaded, Check Valves, NPS 2-1/2 and Larger: Type I or II, Class 125, cast iron.
 8. Globe Valves, NPS 2 and Smaller: Type 2, Class 125, bronze.
 9. Globe Valves, NPS 2-1/2 and Larger: Type I, Class 125, bronze-mounted cast iron.
- G. Select valves, except wafer and flangeless types, with the following end connections:
1. For Copper Tubing, NPS 2 and Smaller: Solder-joint or threaded ends, except provide valves with threaded ends for heating hot water service.
 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged or threaded ends.
 3. For Copper Tubing, NPS 5 and Larger: Flanged ends.
 4. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 5. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends.
 6. For Steel Piping, NPS 5 and Larger: Flanged ends.

END OF SECTION 23 0523

SECTION 23 0529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment components.

1.2 RELATED REQUIREMENTS

- A. Section 23 0548 - Vibration and Seismic Controls for HVAC.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- E. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping; 2025.
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures; 1999 (Reapproved 2022).
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.
- J. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- L. FM (AG) - FM Approval Guide; Current Edition.

- M. MFMA-4 - Metal Framing Standards Publication; 2004.
- N. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2025.
- O. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- P. UL (DIR) - Online Certifications Directory; Current Edition.
- Q. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 3000.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
- C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

1.6 QUALITY ASSURANCE

- A. Comply with applicable building code.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

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. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Prefabricated Trapeze-Framed Metal Strut Systems:

1. MFMA-4 compliant, pre-fabricated, MSS SP-58 type 59 continuous-slot metal strut channel with associated tracks, fittings, and related accessories.
2. Strut Channel or Bracket Material:
 - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
3. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
4. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
5. Accessories: Provide bracket covers, cable basket clips, cable tray clips, clamps, conduit clamps, fire-retarding brackets, j-hooks, protectors, and vibration dampeners.

C. Strut Channels:

1. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.
2. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.
3. Strut design shall include adequate space for piping insulation as required.

D. Hanger Rods:

1. Threaded zinc-plated steel unless otherwise indicated.

E. Pipe Supports:

1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
2. 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.
3. 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.
- F. Beam Clamps:
 1. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
 2. Beam C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
 3. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).
 4. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
 5. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
 6. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish,
 7. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
 8. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
- G. Riser Clamps:
 1. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.
 2. MSS SP-58 type 1 or 8, carbon steel or steel with epoxy plated, plain, stainless steel, or zinc plated finish.
 3. Medium Split Horizontal Pipe Clamp: MSS SP-58 type 4, carbon steel or stainless steel with epoxy plated, plain, stainless steel, or zinc plated finish.
 4. Copper Tube Pipe Clamp: MSS SP-58 type 8, epoxy plated copper.
 5. UL (DIR) listed: Pipe sizes 1/2 to 8 inch.
- H. U-Bolts:
 1. MSS SP-58 Type 24, carbon steel u-bolt for pipe support or anchoring.
- I. Strut Clamps:
 1. Pipe Clamp: Two-piece rigid, universal, or outer diameter type, carbon steel with epoxy copper or zinc finish.
- J. Insulation Clamps:
 1. Two bolt-type clamps designed for installation under insulation.
 2. Material: Carbon steel with epoxy copper or zinc finish.
- K. Pipe Hangers:
 1. Split Ring Hangers:
 - a. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
 - b. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
 - c. Provide hanger rod and nuts of the same type and material for a given pipe run.
 - d. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
 2. Clevis Hangers, Adjustable:
 - a. Copper Tube: MSS SP-58 Type 1, epoxy-plated copper.

- b. Light-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
 - c. Standard-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
- L. Intermediate Pipe Guides:
 - 1. Pipe Diameter 6 inch and Smaller: Provide minimum clearance of 0.16 inch.
 - 2. Pipe Sizes 8 inch: 0.625 inch U-bolt with double nuts providing minimum clearance of 0.28 inch.
 - 3. Pipe Size 10 inch: 0.75 inch U-bolt.
 - 4. Pipe Sizes 12 to 16 inch: 0.875 inch U-bolt.
 - 5. Pipe Sizes 18 to 30 inch: 1 inch U-bolt.
 - 6. Use pipe clamps with oversize pipe sleeve that provides clearance around pipe.
- M. Pipe Alignment Guides:
 - 1. Pipe Sizes 8 inch and Smaller: Spider or sleeve type.
 - 2. Pipe Sizes 10 inch and Larger: Roller type.
- N. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.
- O. Nonpenetrating Rooftop Supports for Low-Slope Roofs:
 - 1. Provide steel pedestals with thermoplastic or rubber base 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.
 - 2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 - 3. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
 - 4. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
- P. Pipe Shields for Insulated Piping:
 - 1. MSS SP-58 Type 40, ASTM A1011/A1011M steel or ASTM A653/A653M carbon steel
 - 2. 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.
- Q. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 - 2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
 - 3. Hollow Masonry: Use toggle bolts.
 - 4. Steel: Use beam-ceiling clamps, beam clamps, machine bolts, or welded threaded studs.
 - 5. Sheet Metal: Use sheet metal screws.

6. Plastic and lead anchors are not permitted.
 7. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - a. Comply with MFMA-4.
 - b. Channel Material: Use galvanized steel.
 - c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
- R. Pipe Installation Accessories:
1. Thermal Insulated, Surface-Mounted Pipe Supports:
 - a. Material: Carbon steel with epoxy copper or zinc finish.
 - b. Weather and UV light resistant foam, plastic, or rubber material with built-in strut.
Maximum Load: 50 lb for single pipe or multiple landed on top strut.

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. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- G. 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. Unless otherwise indicated, mount floor-mounted equipment on properly sized 4 inch high concrete pad constructed in accordance with Section 03 3000.

5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.
- I. Secure fasteners according to manufacturer's recommended torque settings.
- J. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
- C. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
- F. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
- G. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- H. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- I. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

- J. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- K. Install Cast Iron pipe and pipe restraints in compliance with all U S soil pipe and fitting manufacturers' installation instructions and per CISPI Designation 310-11, CISPI Designation 301-09 and the CISPI Cast Iron Soil Pipe Handbook, regarding auxiliary support for ho-hub cast iron pipe and fitting joints over 4 inches (102 mm) in size and for joints subjected to excessive thrust forces, use manufactured assemblies with appropriate thrust pressure ratings, rather than field assembled miscellaneous materials.
- L. Install lateral bracing with pipe hangers and supports to prevent swaying.
- M. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- N. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- P. Insulated Piping:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
 - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
 - 5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
 - 6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.5 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.6 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.7 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.8 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 09 9123 "Interior Painting".
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.9 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- F. Use stainless-steel pipe hangers and stainless-steel or corrosion-resistant attachments for hostile environment applications.
- G. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.
- I. Use thermal-hanger shield inserts for insulated piping and tubing.
- J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 5. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 - 6. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 - 7. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 - 8. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
 - 9. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
- K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
- M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- O. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
- P. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

- Q. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 23 0529

SECTION 23 0548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vibration isolation requirements.
- B. Vibration-isolated equipment support bases.
- C. Vibration isolators.

1.2 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Materials and requirements for fabricated metal supports.
- B. Section 23 0529 - Hangers and Supports for HVAC Piping and Equipment.

1.3 REFERENCE STANDARDS

- A. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for products, including materials, fabrication details, dimensions, and finishes.
 - 1. Vibration Isolators: Include rated load capacities and deflections; include information on color coding or other identification methods for spring element load capacities.

1.5 QUALITY ASSURANCE

- A. Comply with applicable building code.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 VIBRATION ISOLATION REQUIREMENTS

- A. Design and provide vibration isolation systems to reduce vibration transmission to supporting structure from vibration-producing HVAC equipment and/or HVAC connections to vibration-isolated equipment.
- B. Comply with applicable general recommendations of ASHRAE (HVACA), where not in conflict with other specified requirements:
- C. General Requirements:
 - 1. Select vibration isolators to provide required static deflection.
 - 2. Select vibration isolators for uniform deflection based on distributed operating weight of actual installed equipment.
- D. Equipment Isolation: As indicated on drawings.
- E. Piping Isolation:
 - 1. Provide vibration isolators for piping supports:
 - a. Located within 50 feet of connected vibration-isolated equipment and pressure-regulating valve (PRV) stations.
 - b. For piping over 2 inch located below or within 50 feet of noise-sensitive areas indicated.
 - 2. Minimum Static Deflection:
 - a. First Three Supports Closest to Isolated Equipment: Same as static deflection of equipment; maximum of 2 inch deflection required.
 - b. Remainder of Supports: 0.75 inch deflection unless otherwise indicated.
 - 3. Suspended Piping, Nonseismic Applications: Use resilient material isolator hangers, spring isolator hangers, or combination resilient material/spring isolator hangers.
 - 4. Use modular seal or approved resilient material where vibration-isolated piping penetrates building elements (e.g., walls, floors) arranged to prevent vibration transmission to structure.
- F. Thrust Restraint Applications:
 - 1. Use thrust restraints to resist horizontal motion due to thrust for fan heads, suspended fans, and base-mounted and suspended air handling equipment operating at 2.0 inches wg or greater total static pressure.

2.2 VIBRATION-ISOLATED EQUIPMENT SUPPORT BASES

- A. Vibration-Isolated Structural Steel Bases:
 - 1. Description: Engineered structural steel frames with integral mounting provisions for vibration isolators, sized and configured for mounting of equipment.
 - 2. Centrifugal Fan Applications: Provide adjustable motor slide rails as required.
 - 3. Maximum Deflection: 1 inch.
 - 4. Lateral Stability: Minimum lateral stiffness to vertical stiffness ratio of 0.8.
 - 5. Select springs to provide designed deflection of not less than 50 percent of specified deflection.

2.3 VIBRATION ISOLATORS

A. General Requirements:

1. Resilient Materials for Vibration Isolators: Oil, ozone, and oxidant resistant.
2. Spring Elements for Spring Isolators:
 - a. Lateral Stability: Minimum lateral stiffness to vertical stiffness ratio of 0.8.
 - b. Designed to operate in the linear portion of their load versus deflection curve over deflection range of not less than 50 percent above specified deflection.
 - c. Designed to provide additional travel to solid of not less than 50 percent of rated deflection at rated load.
 - d. Selected to function without undue stress or overloading.

B. Vibration Isolators for Nonseismic Applications:

1. Open (Unhoused) Spring Isolators:
 - a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) without a housing.
 - b. Bottom Load Plate: Nonskid, molded, elastomeric isolator material or steel with nonskid elastomeric isolator pad with provisions for bolting to supporting structure as required.
 - c. Furnished with integral leveling device for positioning and securing supported equipment.
2. Housed Spring Isolators:
 - a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) within a metal housing.
 - b. Furnished with integral elastomeric snubbing elements, nonadjustable type, for limiting equipment movement and preventing metal-to-metal contact between housing elements.
 - c. Bottom Load Plate: Steel with nonskid, elastomeric isolator pad with provisions for bolting to supporting structure as required.
 - d. Furnished with integral leveling device for positioning and securing supported equipment.
3. Restrained Spring Isolators, Nonseismic:
 - a. Description: Isolator assembly consisting of single or multiple free-standing, laterally stable steel spring(s) within a metal housing designed to prevent movement of supported equipment above an adjustable vertical limit stop.
 - b. Bottom Load Plate: Steel with nonskid elastomeric isolator pad with provisions for bolting to supporting structure as required.
 - c. Furnished with integral leveling device for positioning and securing supported equipment.
 - d. Provides constant free and operating height.
4. Resilient Material Isolator Hangers, Nonseismic:
 - a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing elastomeric (e.g., neoprene, rubber) or fiberglass isolator material for the lower hanger rod connection.
5. Spring Isolator Hangers, Nonseismic:
 - a. Description: Isolator assembly designed for installation in hanger rod suspension system utilizing single or multiple free-standing, laterally stable steel spring(s) in series with an elastomeric element for the lower hanger rod connection.

- b. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short-circuiting of isolation.
- 6. Combination Resilient Material/Spring Isolator Hangers, Nonseismic:
 - a. Designed to accommodate misalignment of bottom hanger rod up to 30 degrees (plus/minus 15 degrees) without short-circuiting of isolation.
- 7. Thrust Restraints:
 - a. Description: Assembly utilizing free-standing, laterally stable steel spring designed for resisting horizontal motion due to thrust (e.g., air pressure from a fan), and intended for installation in pairs.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that mounting surfaces are ready to receive vibration isolation and/or seismic control components and associated attachments.
- 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. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- C. Secure fasteners according to manufacturer's recommended torque settings.
- D. Field-Welding (where approved by Architect): Comply with Section 05 5000.
- E. Install flexible piping connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.
- F. Vibration Isolation Systems:
 - 1. Vibration-Isolated Equipment Support Bases:
 - a. Provide specified minimum clearance beneath base.
 - 2. Spring Isolators:
 - a. Position equipment at operating height; provide temporary blocking as required.
 - b. Lift equipment free of isolators prior to lateral repositioning to avoid damage to isolators.
 - c. Level equipment by adjusting isolators gradually in sequence to raise equipment uniformly such that excessive weight or stress is not placed on any single isolator.
 - 3. Isolator Hangers:
 - a. Locate isolator hangers at top of hanger rods in accordance with manufacturer's instructions.
 - 4. Thrust Restraints:
 - a. Adjust restraint movement under normal operating static pressure.

5. Clean debris from beneath vibration-isolated equipment that could cause short-circuiting of isolation.
6. Use elastomeric grommets for attachments where required to prevent short-circuiting of isolation.
7. Do not overtighten fasteners such that resilient material isolator pads are compressed beyond manufacturer's maximum recommended deflection.

3.3 FIELD QUALITY CONTROL

- A. Inspect vibration isolation and/or seismic control components for damage and defects.
- B. Vibration Isolation Systems:
 1. Verify isolator static deflections.
 2. Verify required clearance beneath vibration-isolated equipment support bases.
 3. Verify vibration isolation performance during normal operation; investigate sources of isolation short circuits.
- C. Correct deficiencies and replace damaged or defective vibration isolation and/or seismic control components.

END OF SECTION 23 0548

SECTION 23 0553 - 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 09 9123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2023.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2025.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- C. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Air Terminal Units: Tags.
- C. Automatic Controls: Tags. Key to control schematic.
- D. Control Panels: Nameplates.

- E. Dampers: Ceiling tacks, where located above lay-in ceiling.
- F. Ductwork: Stencilled painting.
- G. Heat Transfer Equipment: Nameplates.
- H. Instrumentation: Tags.
- I. Major Control Components: Nameplates.
- J. Piping: Stencilled painting.
- K. Pumps: Nameplates.
- L. Small-sized Equipment: Tags.
- M. Tanks: Nameplates.
- N. Valves: Tags and ceiling tacks where located above lay-in ceiling.
- O. Water Treatment Devices: Nameplates.

2.2 NAMEPLATES

- A. Letter Color: White.
- B. Letter Height: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- C. Background Color: Black.
- D. Plastic: Comply with ASTM D709.
- E. Minimum size: Length and width vary for required label content, but not less than 2-1/2" by 3/4"
- F. Warning Nameplates:
 - 1. Letter Color: Black or White
 - 2. Background Color: Red
 - 3. Label Content: Include caution and warning information plus emergency notification instructions

2.3 TAGS

- A. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- B. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.
- C. Warning Tags
 - 1. Size: 3 by 5-1/4 inches minimum
 - 2. Nomenclature: Large-size primary caption such as "DANGER", "CAUTION", or "DO NOT OPERATE"

3. Color: Safety-yellow background with black lettering

2.4 ADHESIVE-BACKED DUCT MARKERS

- A. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch; printed with UV and chemical resistant inks.
- B. Style: Individual Label.
- C. Color: Yellow/Black.

2.5 STENCILS

- A. 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. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, 3-1/2 inch high letters.
 6. Ductwork and Equipment: 2-1/2 inch high letters.
- B. Stencil Paint: As specified in Section 09 9123, semi-gloss enamel, colors complying with ASME A13.1.

2.6 PIPE MARKERS

- A. Color: Comply with ASME A13.1.
- B. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- C. Color code as follows:
 1. Heating, Cooling, and Boiler Feedwater: Green with white letters.
 2. Toxic and Corrosive Fluids: Orange with black letters.
 3. Compressed Air: Blue with white letters.

2.7 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. 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 09 9123 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. Apply stencil painting in accordance with Section 09 9123.
- D. Install plastic pipe markers in accordance with manufacturer's instructions.
- E. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- F. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

- C. Pipe Label Color Schedule:
1. Label all piping systems in accordance with ANSI/ASME A13.1.
 2. Domestic Water Piping
 - a. Background: Safety green.
 - b. Letter Colors: White.
 3. Sanitary Waste and Storm Drainage Piping:
 - a. Background Color: Safety black.
 - b. Letter Color: White.
 4. Chilled-Water Piping: White letters on a safety-green background.
 5. Heating Water Piping: White letters on a safety-green background.
 6. Refrigerant Piping: White letters on a safety-black background.
 7. Low-Pressure Steam Piping: White letters on a safety-black background.
 8. High-Pressure Steam Piping: White letters on a safety-black background.
 9. Steam-Condensate Piping: White letters on a safety-black background.

3.5 DUCT LABEL INSTALLATION

- A. Install plastic-laminated self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:
1. Blue: For cold-air supply ducts.
 2. Yellow: For hot-air supply ducts.
 3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
- B. Stenciled Duct Label Option: Stenciled labels showing service and flow direction may be provided instead of plastic-laminated duct labels, at Installer's option.
- C. Locate labels near points where ducts enter into and exit from concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.6 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Colors:
1. Toxic and Corrosive Fluids: Black letters on a safety-orange background.
 2. Flammable Fluids: Black letters on a safety-yellow background.
 3. Combustible Fluids: White letters on a safety-brown background.
 4. Potable and Other Water: White letters on a safety-green background.
 5. Compressed Air: White letters on a safety-blue background.
 6. Defined by User: White letters on a safety-purple background, black letters on a safety-white background, white letters on a safety-gray background, and white letters on a safety-black background

3.7 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 23 0553

SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic, steam, and refrigerating systems.
- C. Measurement of final operating condition of HVAC systems.

1.2 RELATED REQUIREMENTS

- A. Section 01 4000 - Quality Requirements: Employment of testing agency and payment for services.

1.3 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2024, with Errata (2025).
- C. NEBB (TAB) - Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems; 2019, with Errata (2022).
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2023.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Include at least the following in the plan:
 - a. List of all air flow, water flow, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Identification and types of measurement instruments to be used and their most recent calibration date.
 - d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - e. Final test report forms to be used.

- f. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 - 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 5. Units of Measure: Report data in I-P (inch-pound) units only.
 - 6. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Engineer.
 - h. Project Contractor.
 - i. Project altitude.
 - j. Report date.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 - 1. AABC (NSTSB), AABC National Standards for Total System Balance.
 - 2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
 - 3. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. TAB Agency Qualifications:
 - 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 - 2. Having minimum of three years documented experience.
 - 3. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
 - b. NEBB, National Environmental Balancing Bureau: www.nebb.org/#sle.

- c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.
- D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.2 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage is minimized.
 - 12. Hydronic systems are flushed, filled, and vented.
 - 13. Pumps are rotating correctly.
 - 14. Proper strainer baskets are clean and in place.
 - 15. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

3.3 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 10 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.4 RECORDING AND ADJUSTING

- A. Field Logs: Maintain written logs including:
 - 1. Running log of events and issues.
 - 2. Discrepancies, deficient or uncompleted work by others.
 - 3. Contract interpretation requests.
 - 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.

- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.5 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.
- M. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

- N. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.
- O. On fan powered VAV boxes, adjust air flow switches for proper operation.

3.6 WATER SYSTEM PROCEDURE

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- D. Effect system balance with automatic control valves fully open to heat transfer elements.
- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
- F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

3.7 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

3.8 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 - 2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Pump curves.
 - 2. Fan curves.
 - 3. Manufacturers' test data.
 - 4. Field test reports prepared by system and equipment installers.
 - 5. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
 2. Name and address of the TAB contractor.
 3. Project name.
 4. Project location.
 5. Architect's name and address.
 6. Engineer's name and address.
 7. Contractor's name and address.
 8. Report date.
 9. Signature of TAB supervisor who certifies the report.
 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.
 - c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Face and bypass damper settings at coils.
 - e. Fan drive settings including settings and percentage of maximum pitch diameter.
 - f. Inlet vane settings for variable-air-volume systems.
 - g. Settings for supply-air, static-pressure controller.
 - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Water and steam flow rates.
 3. Duct, outlet, and inlet sizes.
 4. Pipe and valve sizes and locations.
 5. Terminal units.
 6. Balancing stations.
 7. Position of balancing devices.

3.9 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
1. Manufacturer.
 2. Model/Frame.
 3. HP/BHP.
 4. Phase, voltage, amperage; nameplate, actual, no load.
 5. RPM.
 6. Service factor.

7. Starter size, rating, heater elements.
8. Sheave Make/Size/Bore.

B. Pumps:

1. Identification/number.
2. Manufacturer.
3. Size/model.
4. Impeller.
5. Service.
6. Design flow rate, pressure drop, BHP.
7. Actual flow rate, pressure drop, BHP.
8. Discharge pressure.
9. Suction pressure.
10. Total operating head pressure.
11. Shut off, discharge and suction pressures.
12. Shut off, total head pressure.

C. Combustion Equipment:

1. Boiler manufacturer.
2. Model number.
3. Serial number.
4. Heat input.
5. Heat output.
6. Entering water temperature
7. Leaving water temperature
8. Water flow

D. Chillers:

1. Identification/number.
2. Manufacturer.
3. Capacity.
4. Model number.
5. Serial number.
6. Evaporator entering water temperature, design and actual.
7. Evaporator leaving water temperature, design and actual.
8. Condenser entering water temperature, design and actual.
9. Condenser water flow rate, design and actual.

E. Heat Exchangers:

1. Identification/number.
2. Manufacturer.
3. Model number.
4. Serial number.
5. Primary water entering temperature, design and actual.
6. Primary water leaving temperature, design and actual.
7. Primary water flow, design and actual.
8. Secondary water leaving temperature, design and actual.
9. Secondary water flow, design and actual.

- F. Cooling Coils:
1. Identification/number.
 2. Service.
 3. Manufacturer.
 4. Air flow, design and actual.
 5. Entering air DB temperature, design and actual.
 6. Entering air WB temperature, design and actual.
 7. Leaving air DB temperature, design and actual.
 8. Leaving air WB temperature, design and actual.
 9. Water flow, design and actual.
 10. Entering water temperature, design and actual.
 11. Leaving water temperature, design and actual.
 12. Air pressure drop, design and actual.
- G. Heating Coils:
1. Identification/number.
 2. Service.
 3. Manufacturer.
 4. Air flow, design and actual.
 5. Water flow, design and actual.
 6. Entering water temperature, design and actual.
 7. Leaving water temperature, design and actual.
 8. Entering air temperature, design and actual.
 9. Leaving air temperature, design and actual.
- H. Electric Duct Heaters:
1. Manufacturer.
 2. Identification/number.
 3. Model number.
 4. Design kW.
 5. Number of stages.
 6. Phase, voltage, amperage.
 7. Test voltage (each phase).
 8. Test amperage (each phase).
 9. Air flow, specified and actual.
 10. Temperature rise, specified and actual.
- I. Air Moving Equipment:
1. Manufacturer.
 2. Model number.
 3. Serial number.
 4. Arrangement/Class/Discharge.
 5. Air flow, specified and actual.
 6. Return air flow, specified and actual.
 7. Outside air flow, specified and actual.
 8. Total static pressure (total external), specified and actual.
 9. Fan RPM.

- J. Return Air/Outside Air:
 - 1. Identification/location.
 - 2. Design air flow.
 - 3. Actual air flow.
- K. Exhaust Fans:
 - 1. Manufacturer.
 - 2. Model number.
 - 3. Serial number.
 - 4. Air flow, specified and actual.
 - 5. Total static pressure (total external), specified and actual.
 - 6. Fan RPM.
- L. Terminal Unit Data:
 - 1. Manufacturer.
 - 2. Type, constant, variable, single, dual duct.
 - 3. Identification/number.
 - 4. Model number.
 - 5. Size.
 - 6. Minimum design air flow.
 - 7. Maximum design air flow.
 - 8. Maximum actual air flow.
- M. Air Distribution Tests:
 - 1. Air terminal number.
 - 2. Room number/location.
 - 3. Design air flow.
 - 4. Test (final) air flow.
 - 5. Percent of design air flow.

END OF SECTION 23 0593

SECTION 23 0713 - DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct liner.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 23 0553 - Identification for HVAC Piping and Equipment.

1.3 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2026.
- C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.
- D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2025.
- E. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2020.
- F. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2025.
- G. ASTM C1423 - Standard Guide for Selecting Jacketing Materials for Thermal Insulation; 2021.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- J. SAE AMS3779 - Tape, Adhesive, Pressure-Sensitive Thermal Radiation Resistant, Aluminum Coated Glass Cloth; 2016b.
- K. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- L. UL 181A - Closure Systems for Use with Rigid Air Ducts; Current Edition, Including All Revisions.
- M. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period 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 or UL 723.

2.2 DUCT LINER

- A. Manufacturers:
 - 1. Aeroflex USA; AEROFLEX Breathe-EZ
 - 2. Armacell LLC; ArmaFlex Ultra with FlameDefense
 - 3. Knauf Insulation; Performance+ Duct Liner
 - 4. Manson Insulation, a company of Knauf Insulation; Akousti-Liner
 - 5. Owens Corning Corporation; QuietR Rotary Duct Insulation
- B. Elastomeric Foam Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
 - 1. Minimum Service Temperature: Minus 40 degrees F.
 - 2. Maximum Service Temperature: 180 degrees F.

3. Apparent Thermal Conductivity: Maximum of 0.28 at 75 degrees F.
 4. Minimum Noise Reduction Coefficients:
 - a. 1/2 inch Thickness: 0.30.
 - b. 1 inch Thickness: 0.40.
 5. Erosion Resistance: Does not show evidence of breaking away, flaking off, or delamination at velocities of 10,000 fpm when tested in accordance with ASTM C1071.
 6. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation. Comply with ASTM C916.
1. Sealant: Provide sealant compatible with the liner facing at all liner joints, seams, and duct penetrations to maintain a continuous air- and vapor-resistant surface.
- D. Adhesive: Waterproof, fire-retardant type, ASTM C916.
- E. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.
- C. Verify that systems to be insulated have been tested and are free of defects.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Ducts Conveying Air Below Ambient Temperature:
 1. Provide insulation with vapor barrier jackets.
 2. Finish with tape and vapor barrier jacket.
 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Insulated Ducts Conveying Air Above Ambient Temperature:
 1. Provide with or without standard vapor barrier jacket.
 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- E. Slope exterior ductwork to shed water.
- F. External Duct Insulation Application:
 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.

2. Secure insulation without vapor barrier with staples, tape, or wires.
3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

G. Duct and Plenum Liner Application:

1. Adhere insulation with adhesive for 90 percent coverage.
2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
3. Seal and smooth joints. Seal and coat transverse joints.
4. Seal liner surface penetrations with adhesive.
5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

3.3 CLEANING

- A. Remove adhesive overspray, debris, and cut liner scraps from duct interior prior to closing ductwork.
- B. Vacuum duct interior of loose fibers and construction debris prior to system startup.

3.4 DUCT AND PLENUM APPLICATION SCHEDULE

- A. Service: Round and rectangular, supply-air, ducts concealed and exposed.
 1. Material: Duct liner.
 2. Number of Layers: One.
 3. Field-Applied Jacket: None, factory applied.
 4. Vapor Retarder Required: Yes.
 5. R-value: Minimum of 5.6 at 0.75 pcf.
- B. Service: Round and rectangular, exhaust-air, ducts concealed and exposed.
 1. Material: Duct liner.
 2. Thickness: 1/2 inches.
 3. Number of Layers: One.
 4. Field-Applied Jacket: None, factory applied.
 5. Vapor Retarder Required: Yes.

END OF SECTION 23 0713

SECTION 23 0719 - HVAC PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.
- C. Weather barrier coatings.
- D. Jacketing and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

1.3 REFERENCE STANDARDS

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2026.
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- C. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
- D. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2024).
- E. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- F. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2026.
- G. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2025.
- H. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.
- I. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.
- J. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2022.
- K. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation; 2022.

- L. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
- M. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation; 2023.
- N. ASTM C1423 - Standard Guide for Selecting Jacketing Materials for Thermal Insulation; 2021.
- O. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces; 2025.
- P. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2025.
- Q. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- R. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- S. SAE AMS3779 - Tape, Adhesive, Pressure-Sensitive Thermal Radiation Resistant, Aluminum Coated Glass Cloth; 2016b.
- T. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

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.

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 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

- A. Manufacturers:
 - 1. CertainTeed Corporation
 - 2. Johns Manville
 - 3. Knauf Insulation
 - 4. Owens Corning
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. K Value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
 - 2. Maximum Service Temperature: 850 degrees F.
 - 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 - 3. Secure with pressure-sensitive tape.
- D. Vapor Barrier Tape:
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film with pressure-sensitive rubber-based adhesive.

2.3 GLASS FIBER, RIGID

- A. Manufacturers:
 - 1. CertainTeed Corporation
 - 2. Johns Manville Corporation
 - 3. Knauf Insulation
 - 4. Owens Corning Corporation
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
 - 1. K Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 850 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.

2.4 EXPANDED POLYSTYRENE

- A. Insulation: ASTM C578; rigid closed cell.
 - 1. K Value: 0.23 at 75 degrees F.
 - 2. Maximum Service Temperature: 165 degrees F.
 - 3. Maximum Water Vapor Permeance: 5.0 perm.

2.5 POLYISOCYANURATE CELLULAR PLASTIC

- A. Insulation Material: ASTM C591, rigid molded modified polyisocyanurate cellular plastic.
 - 1. Dimension: Comply with requirements of ASTM C585.
 - 2. K Value: 0.18 at 75 degrees F, when tested in accordance with ASTM C518.
 - 3. Minimum Service Temperature: Minus 70 degrees F.
 - 4. Maximum Service Temperature: 300 degrees F.
 - 5. Water Absorption: 0.5 percent by volume, maximum, when tested in accordance with ASTM D2842.
 - 6. Moisture Vapor Transmission: 4.0 perm inch.
 - 7. Connection: Waterproof vapor barrier adhesive.

2.6 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
 - 1. Aeroflex USA; AEROFLEX Self-Seal
 - 2. Armacell LLC; ArmaFlex Ultra with FlameDefense
 - 3. K-Flex USA LLC; K-Flex Titan
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 - 1. Minimum Service Temperature: Minus 40 degrees F.
 - 2. Maximum Service Temperature: 180 degrees F.
 - 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
- D. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

2.7 WEATHER BARRIER COATINGS

- A. Weather-Resistive Barrier Coating: Fire-resistive, UV resistant, water-based mastic for use over closed cell polyethylene and polyurethane foam insulation; applied with glass fiber or synthetic reinforcing mesh.
 - 1. Manufacturers:
 - a. H.B. Fuller Construction Products, Inc; Childers - CP Series Weather Barrier Coating
 - 2. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A, when tested in accordance with ASTM E84.
 - 3. Water Vapor Permeance: Greater than 1.0 perm in accordance with ASTM E96/E96M.

2.8 JACKETING AND ACCESSORIES

A. PVC Plastic.

1. 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, 0.010 inch.
 - e. Connections: Brush on welding adhesive.
2. Covering Adhesive Mastic: Compatible with insulation.

B. Aluminum Jacket:

1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
2. Thickness: 0.016 inch sheet.
3. Type: Factory-applied, self-adhesive jacketing.
4. Finish: Embossed.
5. Joining: Longitudinal slip joints and 2 inch laps.
6. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
7. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

C. Reinforced Tape:

1. FSK tape suitable for sealing seams between insulation, insulated pipe bends, and fittings resulting in a tight, smooth surface without wrinkles.
2. Comply with UL 723, ASTM E84.
3. Moisture Vapor Permeability: 0.00 perm inch, when tested in accordance with ASTM E96/E96M.
4. Finish: Match insulation.

2.9 ACCESSORIES

A. General Requirements:

1. Provide required accessories in accordance with and subject to the recommendations of the insulation manufacturer.
2. Furnish compatible materials which do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state.
3. Comply with ASTM C795 requirements for materials to be used on stainless steel surfaces.
4. Supply materials that are asbestos free.

B. Corrosion Inhibitors:

1. Corrosion Control Gel:
 - a. Corrosion Protection: Comply with ASTM B117 and ASTM D610.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Test piping for design pressure, liquid tightness, and continuity prior to 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:
 - 1. 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 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- H. 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.
- I. 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 Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
 - 4. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 8400.

- K. Pipe Exposed in Mechanical Equipment Rooms in high traffic areas adjacent to service or walk ways (less than 7 feet above finished floor): Finish with PVC or Aluminum jacket including fitting covers.
- L. Finished Spaces (less than 10 feet above finished floor or as required in ceiling to meet Architect's intent): Finish with canvas jacket sized for finish painting or paintable PVC jacket in high traffic areas.
- M. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping. Provide two coats of UV resistant finish for flexible elastomeric cellular insulation without jacketing.
- N. Buried Piping: Provide factory-fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with 1 mil, 0.001 inch thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with polyester film.
- O. 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 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.4 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

3.5 INDOOR PIPING INSULATION SCHEDULE

- A. Service: Indoor Hydronic hot water.
 - 1. Operating Temperature: 60 to 180 deg F.
 - 2. Insulation Material: Mineral-fiber preformed pipe.
 - 3. Insulation Thickness: Apply the following insulation thickness:
 - a. Pipe Sizes 1.5" and less, 1-1/2" thick.

- b. Pipe Sizes 2" and larger, 2" thick.
 - 4. Vapor Retarder Required: Yes.
- B. Service: Indoor Hydronic Chilled water.
 - 1. Operating Temperature: 35 to 50 deg F (2 to 10 deg C).
 - 2. Insulation Material: Mineral-fiber preformed pipe.
 - 3. Insulation Material: Closed cell flexible elastomeric.
 - 4. Insulation Thickness: Apply the following insulation thickness:
 - a. Pipe Sizes 1.5" and less, 1" thick.
 - b. Pipe Sizes 2" and larger, 1-1/2" thick.
 - 5. Vapor Retarder Required: Yes.
- C. Service: Exterior Hydronic Chilled water.
 - 1. Operating Temperature: 35 to 50 deg F (2 to 10 deg C).
 - 2. Insulation Material: Closed cell preformed pipe (polystyrene or polyisocyanurate).
 - 3. Insulation Thickness: Apply the following insulation thickness:
 - a. Pipe Sizes 1.5" and less, 1" thick.
 - b. Pipe Sizes 2" and larger, 1-1/2" thick.
 - 4. Vapor Retarder Required: Yes.
 - 5. Field Applied Jacket: Aluminum mill finish.
- D. Service: A/C Condensate Drain Lines.
 - 1. Operating Temperature: 50 to 75 deg F.
 - 2. Insulation Material: Mineral-fiber preformed pipe.
 - 3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Copper Pipe, all sizes 1" thick.
 - 4. Vapor Retarder Required: Yes.
- E. Service: All Refrigerant Piping Located Outdoors.
 - 1. Operating Temperature: 35 to 200 deg F (2 to 93.3 deg C).
 - 2. Insulation Material: Flexible elastomeric thermal insulation.
 - 3. Insulation Thickness: Apply the following insulation thickness:
 - a. All Pipe Sizes, 1" thick.
 - 4. Field Applied Jacket: Paint outdoor insulation to protect from ultra-violet rays.
- F. Service: All Refrigerant Piping Located Indoors.
 - 1. Operating Temperature: 35 to 200 deg F (2 to 93.3 deg C).
 - 2. Insulation Material: Flexible elastomeric thermal insulation.
 - 3. Insulation Thickness: Apply the following insulation thickness:
 - a. All Pipe Sizes, 3/4" thick.
 - 4. Vapor Retarder Required: Yes.
- G. Service: Steam and Steam Condensate.
 - 1. Operating Temperature: 100 to 250 deg F (37.8 to 121.1 deg C).
 - 2. Insulation Material: Mineral-fiber preformed pipe.
 - 3. Insulation Thickness: Apply the following insulation thickness:
 - a. Pipe Sizes 1-1/2" and less, 1-1/2" thick.
 - b. Pipe sizes 2" and larger, 3" thick.
 - 4. Vapor Retarder Required: Yes.

H. Service: Aquatherm Piping

1. Insulate domestic cold, hot and recirculating hot water piping, heating water supply and return piping and chilled water supply and return piping as indicated above. Insulation shall be on all piping, valves and fittings.

END OF SECTION 23 0719

SECTION 23 0913 - INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Control panels.
- B. Control Valves:
 - 1. Ball valves with factory-mounted actuators.
 - 2. Electronic valve operators.
- C. Damper Operators:
 - 1. Electric operators.
- D. Wall-, Surface-, and Duct-Mounted Sensors:
 - 1. Temperature sensors.
 - 2. Humidity sensors.
 - 3. Static air pressure sensors.
 - 4. Damper position indicators.
- E. Thermostats:
 - 1. Electric thermostats.
- F. Pipe-Mounted Sensors and Transmitters:
 - 1. Temperature sensors.
 - 2. Pressure transmitters.
- G. Flow Sensors:
 - 1. Venturi tubes.
 - 2. Annular pitot tubes.

1.2 RELATED REQUIREMENTS

- A. Section 23 0519 - Meters and Gauges for HVAC Piping: Thermometer sockets and gauge taps.
- B. Section 23 2113 - Hydronic Piping: Installation of control valves, flow switches, temperature sensor sockets, and gauge taps.
- C. Section 23 2114 - Hydronic Specialties.
- D. Section 23 3300 - Air Duct Accessories.
- E. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.
- F. Section 26 2726 - Wiring Devices: Elevation of exposed components.

1.3 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2018.
- B. ANSI/FCI 70-2 - Control Valve Seat Leakage; 2021.
- C. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2026).
- D. ASME B1.20.1 - Pipe Threads, General Purpose, Inch; 2013 (Reaffirmed 2018).
- E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- F. ASTM B32 - Standard Specification for Solder Metal; 2020.
- G. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- H. NEMA BS 31032 - Residential Controls—Electrical Wall-Mounted Room Thermostats; 2025.
- I. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2027.

1.4 SUBMITTALS

- A. See Section 01 3000 - 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 location of control components, including panels, thermostats, and sensors.
 - 1. Revise shop drawings to reflect actual installation and operating sequences.
- F. Warranty: Submit manufacturer's 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 01 6000 - Product Requirements for additional provisions.
 - 2. Extra Thermostats and Other Exposed Sensors: One of each type.

1.5 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.

1.6 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a three year period after Substantial Completion.

PART 2 PRODUCTS

2.1 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.2 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 EN 10250, general purpose utility enclosures with enameled finished face panel.
- C. Provide common keying for all panels.

2.3 CONTROL VALVES

- A. Ball Valves with Factory-Mounted Actuators:
 - 1. Manufacturers:
 - a. Belimo Aircontrols (USA), Inc; _____: www.belimo.com/#sle.
 - b. Johnson Controls International, PLC; _____: www.johnsoncontrols.com/#sle.
 - 2. Service: Use for chilled water or hot water.
 - 3. Flow Characteristic: Include 2-way and 3-way diverting operation configured to fail normally open (heating water) and normally closed (chilled water) unless mission critical cooling application.
 - 4. Size and select Cv for 3psig target pressure drop at design flow rate.
 - 5. Replacements in Kind: Provide pressure-independent type.
 - 6. Rangeability: 500 to 1.
 - 7. ANSI Rating: Class 150.
 - 8. Leakage: Class IV (0.1 percent of rated capacity) per ANSI/FCI 70-2.
 - 9. Body Size:
 - a. Under 2-1/2 inches:
 - 1) Connection: Match piping connection type.

- 2) Materials:
 - a) Body: Brass.
 - b) Flanges: Ductile iron.
 - c) Ball: 300 series stainless steel.
 - d) Stem: 300 series stainless steel.
 - e) Seat: Graphite-reinforced PTFE with EPDM O-Ring backing.
 - f) Stem Seal: EPDM O-Rings.
 - g) Flow Control Disk: Thermoplastic synthetic-resin.
- b. Service Temperature:
 - 1) Fluid Side: 0 to 284 degrees F liquid or 25 psig steam.
 - 2) Ambient Side: From minus 4 to 122 degrees F.
- 10. Actuator Requirements:
 - a. Assembly: Factory-mounted.
 - b. Input: 0 to 10VDC or 24 VAC per the application configured as indicated on drawings.
 - c. Accessories: Provide with valve position indicator and manual override.
- B. Electronic Valve Actuators:
 - 1. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
 - 2. Select operator for full shut-off at maximum pump differential pressure.

2.4 DAMPER OPERATORS

- A. General:
 - 1. Provide actuators with torque capacity sized for minimum of 20 percent greater than maximum design stream velocity and hold tight seal against maximum system pressures.
 - 2. Provide spring return for two position control and for fail safe operation.
 - 3. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
 - 4. Provide one operator for maximum 36 sq ft damper section.
- B. Electric Operators:
 - 1. Spring return, adjustable stroke motor having oil immersed gear train, with auxiliary end switch, minimum position potentiometer, and and 24 V dc, 24 va transformer as required.
- C. Inlet Vane Operators:
 - 1. High pressure with pilot positioners and sufficient force to move vanes when fan is started with vanes in closed position. Return vane operator to closed position on fan shutdown.

2.5 WALL-, SURFACE-, AND DUCT-MOUNT 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. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F.
 - 3. 100 ohm platinum RTD is acceptable if used with project DDC controllers.

4. Temperature Sensing Device: Compatible with project DDC controllers.
5. 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) Chilled Water Accuracy: Plus/minus 0.50 degrees F minimum.
 - 4) All Other Accuracy: Plus/minus 0.75 degrees F minimum.
 - 5) 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.
 - 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 to 230 degrees F.
 - 3) Use temperature transmitters in conjunction with RTDs when RTDs 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.

B. Humidity Sensors, Duct-Mounted:

1. Manufacturers:
 - a. Dwyer Instruments Inc; _____: www.dwyer-inst.com/#sle.
 - b. Johnson Controls International, PLC; _____: www.johnsoncontrols.com/#sle.
 - c. Veris Industries; HD Series: www.veris.com/#sle.
2. Digitally profiled thin-film capacitive sensor probe extended from die-cast metal, weather-proof plastic or metal housing designed for duct mounting.
3. Measuring Scale: 0 to 100 percent RH, noncondensing, temperature compensated.
4. Hardwired Output: Two-wire or Three-wire, 4 to 20 mA or 0 to 10 VDC, loop powered.
5. Accuracy: Plus/minus 1 percent between 10 to 80 percent RH linear range, NIST traceable with multi-point calibration.

C. Static-Air Pressure Sensors:

1. Manufacturers:
 - a. Johnson Controls International, PLC; _____: www.johnsoncontrols.com/#sle.
 - b. Veris Industries; PG Series: www.veris.com/#sle.
2. Unidirectional with ranges not exceeding 150 percent of maximum expected input.
3. Temperature compensate with typical thermal error or 0.06 percent of full scale in temperature range of 40 to 100 degrees F.
4. Accuracy: One percent of full scale with repeatability 0.3 percent.
5. Output: 0 to 5 vdc with power at 12 to 28 vdc.

- D. Damper Position Indicators: Potentiometer mounted in enclosure with adjustable crank arm assembly connected to damper to transmit 0 to 100 percent damper travel.

2.6 THERMOSTATS

A. Electric Thermostats:

1. Manufacturers:
 - a. Johnson Controls International, PLC; _____: www.johnsoncontrols.com/#sle.
2. Type: NEMA BS 31032, 24 volts, with setback/setup temperature control.
3. Service: Cooling and heating.
4. Covers: Locking with set point adjustment and setpoint indication, with thermometer.

2.7 PIPE-MOUNTED SENSORS AND TRANSMITTERS

A. Temperature Sensors:

1. Pipe-mounted temperature probe tied to weather-resistant enclosure for direct insertion into compatible liquids or gases or inserted into intermediary thermal grease-filled pipe-well compatible with interfaced fluid.
2. Sensor Type: 1,000 ohm Nickel RTD.
3. Transmitter: Fitted within probe-interface enclosure, calibrated.
 - a. Monitoring Range: As required for system type, adjustable.
 - b. Hardwired Output: Two-wire, 4 to 20 mA, loop powered.
 - c. Accuracy: Plus/minus two percent. adjustable on the transmitter end.

B. Pressure Transmitters:

1. Self-contained transducer for monitoring of pneumatic, gas, liquid, or steam service with proportional range scaled over selected electronic output.
2. Service Monitoring Range: 0 to 120% or greater of system operation.
3. Wetted Material: Brass for general service or stainless steel for steam and corrosive.
4. Hardwired Output: Two-wire, 4 to 20 mA, loop powered.

2.8 FLOW SENSORS

A. Venturi Tubes:

1. Fabricate the venturi tube from cast iron with an accuracy of plus/minus 1 percent of full flow.
2. Line the throat section with austenitic stainless steel.
3. Thermal Expansion Characteristics of the Lining: Same as that of the throat casting material.
4. Machine the surface of the throat to plus/minus 50 micro-inches, including the short curvature leading from the converging entrance section into the throat.

B. Annular Pitot Tubes:

1. Fabricate the annular pitot tube from austenitic stainless steel with an accuracy of plus/minus 2 percent of full flow and a repeatability of plus/minus 0.50 percent of measured value.
2. Unit to have at least one static port with no less than four total head pressure ports with an averaging manifold.

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, humidistats, and exposed control sensors with plans and room details before installation. Locate 48 inches above floor. Align with lighting switches; see Section 26 2726.
- 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 valves with position indicators and with pilot positioners where sequenced with other controls.
- G. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.
- H. Mount control panels adjacent to associated equipment on vibration free walls or free-standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.
- I. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- J. Provide conduit and electrical wiring in accordance with Section 26 0583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.3 MAINTENANCE

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements relating to maintenance service.
- B. Provide service and maintenance of control system for one year from Date of Substantial Completion.
- C. Provide complete service of controls systems, including call backs, and submit written report of each service call.

END OF SECTION 23 0913

SECTION 23 0923 - DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. System description.
- B. Operator interface.
- C. Controllers.
- D. Power supplies and line filtering.
- E. System software.
- F. Controller software.

1.2 RELATED REQUIREMENTS

- A. Section 23 0913 - Instrumentation and Control Devices for HVAC.
- B. Section 23 0993 - Sequence of Operations for HVAC Controls.
- C. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

- A. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; 2024, with Errata (2026).
- B. MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests; 2019h, with Editorial Revision (2022).
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for each system component and software module.
- C. Shop Drawings:
 - 1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
 - 2. List connected data points, including connected control unit and input device.

3. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration digital media containing graphics.
 4. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
 5. Indicate description and sequence of operation of operating, user, and application software.
- D. Operation and Maintenance Data:
1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
 2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
 3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
- E. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with NFPA 70.
- B. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for purpose specified and indicated.

1.6 WARRANTY

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

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Johnson Controls

2.2 SYSTEM DESCRIPTION

- A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units.
- B. Base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.
- C. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.

- D. Controls for variable air volume terminals, radiation, reheat coils, unit heaters, fan coils, and the like when directly connected to the control units. Individual terminal unit control is specified in Section 23 0913.
- E. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
- F. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.
- G. Provide a seamless connection to the existing Johnson Controls Metasys building automation system (BAS) with no loss of functionality and no additional gateways, interface devices or servers. Entire system must be compliant with South Dakota Bureau of Information and Telecommunications (BIT) standards and protocols. Contractor shall demonstrate functional requirements and connectivity to the Owner and A/E prior to approval of shop drawings. Functional requirements include, but are not limited to:
 - 1. Upload/Download of controllers from the existing campus Johnson Controls ADX server.
 - 2. Flashing of controllers with permanent changes to controller programs.
 - 3. Controller level occupancy scheduling.
 - 4. Parameter access for controllers.
 - 5. Global data sharing and scheduling.
 - 6. Setpoint change.
 - 7. Number of terminal unit points limited to those specified or needed for the operational sequence.
 - 8. Include point mapping and graphic construction.
 - 9. Global processes to include, but not limited to fire alarm system management (alarm, supervisory and trouble), outdoor lighting, and meter management; including the integration and connection of any new utility meters to the existing Johnson Controls Energy Essentials software, where applicable per points list.
 - 10. Fire alarm reporting (where applicable) and dispatch must route through the existing BAS, where applicable.
 - 11. All work by the temperature control subcontractor shall be independent of other vendors and Owner intervention.
 - 12. Temperature control subcontractor to provide all training needed to allow Owner to operate and maintain the system.
 - 13. Temperature control subcontractor to provide electronic copies of all operating system software and project database.
 - 14. Temperature controls subcontractor to provide copies of all software configuration files (*.caf, etc.) for all field controllers after the balancing and adjustments.
 - 15. Temperature controls contractor shall provide Owner with all the necessary training and tools to add/modify/delete/edit graphics with in-house technicians.
 - 16. Owner to provide all operator workstation hardware including peripheral devices.

2.3 OPERATOR INTERFACE

- A. DDC system shall be Web based.
 - 1. Web-Based Access to DDC System:

- a. DDC system software shall be based on server thin-client architecture, designed around open standards of Web technology. DDC system server shall be accessed using a Web browser over DDC system network, using Owner's LAN, and remotely over Internet.
- b. Intent of thin-client architecture is to provide operators complete access to DDC system via a Web browser. No special software other than a Web browser shall be required to access graphics, point displays, and trends; to configure trends, points, and controllers; and to edit programming.
- c. Web access shall be password protected.
- d. Web based DDC system shall allow full access to adjust, perform startup, and commission system without the requirement of additional software tools or subscription fees.

2.4 CONTROLLERS

A. Building Controllers:

- 1. General:
 - a. Manage global strategies by one or more, independent, standalone, microprocessor based controllers.
 - b. Provide sufficient memory to support controller's operating system, database, and programming requirements.
 - c. Share data between networked controllers.
 - d. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.
 - e. Utilize real-time clock for scheduling.
 - f. Continuously check processor status and memory circuits for abnormal operation.
 - g. Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
 - h. Communication with other network devices to be based on assigned protocol.
- 2. Communication:
 - a. Controller to reside on a BACnet network using ISO 8802-3 (ETHERNET) Data Link/Physical layer protocol.
 - b. Perform routing when connected to a network of custom application and application specific controllers.
 - c. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
- 3. Anticipated Environmental Ambient Conditions:
 - a. Outdoors and/or in Wet Ambient Conditions:
 - 1) Mount within waterproof enclosures.
 - 2) Rated for operation at 40 to 150 degrees F.
 - b. Conditioned Space:
 - 1) Mount within dustproof enclosures.
 - 2) Rated for operation at 32 to 120 degrees F.
- 4. Provisions for Serviceability:
 - a. Diagnostic LEDs for power, communication, and processor.
 - b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.

5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
 6. Power and Noise Immunity:
 - a. Maintain operation at 90 to 110 percent of nominal voltage rating.
 - b. Perform orderly shutdown below 80 percent of nominal voltage.
 - c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet.
- B. Application Specific Controllers:
1. General:
 - a. Not fully user programmable, microprocessor based controllers dedicated to control specific equipment.
 - b. Customized for operation within the confines of equipment served.
 - c. Communication with other network devices to be based on assigned protocol.
 2. Communication:
 - a. Controller to reside on a BACnet network using MS/TP Data Link/Physical layer protocol.
 - b. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
 3. Anticipated Environmental Ambient Conditions:
 - a. Outdoors and/or in Wet Ambient Conditions:
 - 1) Mount within waterproof enclosures.
 - 2) Rated for operation at 40 to 150 degrees F.
 - b. Conditioned Space:
 - 1) Mount within dustproof enclosures.
 - 2) Rated for operation at 32 to 120 degrees F.
 4. Provisions for Serviceability:
 - a. Diagnostic LEDs for power, communication, and processor.
 - b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
 5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
 6. Power and Noise Immunity:
 - a. Maintain operation at 90 to 110 percent of nominal voltage rating.
 - b. Perform orderly shutdown below 80 percent of nominal voltage.
 - c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W at 3 feet.
 7. Smart Thermostat:
 - a. Alphanumeric display with button interface, white faceplate or fascia, multi-language support, surface or wall-mount over single gang box.
 - b. Sensor: 1,000 ohm Platinum RTD within insulated thermoplastic enclosure.
 - c. Adjustments: Setpoint, schedules, and point alarm criteria.
 - d. Temperature Control: Heating or cooling, On/Off control.
 - e. Fan Control: Two speed, On/Off.
 - f. Primary Interface: ASHRAE Std 135 BACnet MS/TP communications.
 - g. Certification: BACnet Testing Laboratory (BTL) certified device listed under the BACnet Smart Sensor (B-SS) device profile in compliance with ASHRAE Std 135.

C. Input/Output Interface:

1. Hardwired inputs and outputs tie into the DDC system through building, custom application, or application specific controllers.
2. All Input/Output Points:
 - a. Protect controller from damage resulting from any point short-circuiting or grounding and from voltage up to 24 volts of any duration.
 - b. Provide universal type for building and custom application controllers where input or output is software designated as either binary or analog type with appropriate properties.
3. Binary Inputs:
 - a. Allow monitoring of On/Off signals from remote devices.
 - b. Provide wetting current of 12 mA minimum, compatible with commonly available control devices and protected against the effects of contact bounce and noise.
 - c. Sense dry contact closure with power provided only by the controller.
4. Pulse Accumulation Input Objects: Comply with all requirements of binary input objects and accept up to 10 pulses per second.
5. Analog Inputs:
 - a. Allow for monitoring of low voltage 0 to 10 VDC, 4 to 20 mA current, or resistance signals (thermistor, RTD).
 - b. Compatible with and field configurable to commonly available sensing devices.
6. Binary Outputs:
 - a. Used for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.
 - b. Outputs provided with three position (On/Off/Auto) override switches.
 - c. Status lights for building and custom application controllers to be selectable for normally open or normally closed operation.
7. Analog Outputs:
 - a. Monitoring signal provides a 0 to 10 VDC or a 4 to 20 mA output signal for end device control.
 - b. Provide status lights and two position (AUTO/MANUAL) switch for building and custom application controllers with manually adjustable potentiometer for manual override on building and custom application controllers.
 - c. Drift to not exceed 0.4 percent of range per year.
8. Tri State Outputs:
 - a. Coordinate two binary outputs to control three point, floating type, electronic actuators without feedback.
 - b. Limit the use of three point, floating devices to the following zone and terminal unit control applications:
 - 1) VAV terminal units.
 - 2) Duct mounted heating coils.
 - 3) Radiation.
 - c. Control algorithms run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.
9. System Object Capacity:
 - a. System size to be expandable to twice the number of input output objects required by providing additional controllers, including associated devices and wiring.

- b. Hardware additions or software revisions for the installed operator interfaces are not to be required for future, system expansions.

2.5 POWER SUPPLIES AND LINE FILTERING

A. Power Supplies:

1. Provide UL listed control transformers with Class 2 current limiting type or over-current protection in both primary and secondary circuits for Class 2 service as required by the NEC.
2. Limit connected loads to 80 percent of rated capacity.
3. Match DC power supply to current output and voltage requirements.
4. Unit to be full wave rectifier type with output ripple of 5.0 mV maximum peak to peak.
5. Regulation to be 1 percent combined line and load with 100 microsecond response time for 50 percent load changes.
6. Provide over-voltage and over-current protection to withstand a 150 percent current overload for 3 seconds minimum without trip-out or failure.
7. Operational Ambient Conditions: 32 to 120 degrees F.
8. EM/RF meets FCC Class B and VDE 0871 for Class B and MIL-STD-810 for shock and vibration.
9. Line voltage units UL recognized and CSA approved.

B. Power Line Filtering:

1. Provide external or internal transient voltage and surge suppression component for all workstations and controllers.
2. Minimum surge protection attributes:
 - a. Dielectric strength of 1000 volts minimum.
 - b. Response time of 10 nanoseconds or less.
 - c. Transverse mode noise attenuation of 65 dB or greater.
 - d. Common mode noise attenuation of 150 dB or greater at 40 to 100 Hz.

2.6 LOCAL AREA NETWORK (LAN)

- A. Provide communication between control units over local area network (LAN).
- B. LAN Capacity: Not less than 60 stations or nodes.
- C. Break in Communication Path: Alarm and automatically initiate LAN reconfiguration.
- D. LAN Data Speed: Minimum 19.2 Kb.
- E. Communication Techniques: Allow interface into network by multiple operation stations and by auto-answer/auto-dial modems. Support communication over telephone lines utilizing modems.
- F. Transmission Median: Fiber optic or single pair of solid 24 gauge twisted, shielded copper cable.
- G. Network Support: Time for global point to be received by any station, shall be less than 3 seconds. Provide automatic reconfiguration if any station is added or lost. If transmission cable

is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

2.7 USER INTERFACE

A. System Requirements:

1. System Graphics:
 - a. Allow up to 10 graphic screens, simultaneously displayed for comparison and monitoring of system status.
 - b. Animation displayed by shifting image files based on object status.
 - c. Provide method for operator with password to perform the following:
 - 1) Move between, change size, and change location of graphic displays.
 - 2) Modify on-line.
 - 3) Add, delete, or change dynamic objects consisting of:
 - a) Analog and binary values.
 - b) Dynamic text.
 - c) Static text.
 - d) Animation files.
2. Custom Graphics Generation Package:
 - a. Create, modify, and save graphic files and visio format graphics in PCX formats.
 - b. HTML graphics to support web browser compatible formats.
 - c. Capture or convert graphics from AutoCAD.
3. Standard HVAC Graphics Library:
 - a. HVAC Equipment:
 - 1) Chillers.
 - 2) Boilers.
 - 3) Air Handlers.
 - 4) Terminal HVAC Units.
 - 5) Fan Coil Units.
 - 6) Unit Ventilators.
 - b. Ancillary Equipment:
 - 1) Fans.
 - 2) Pumps.
 - 3) Coils.
 - 4) Valves.
 - 5) Piping.
 - 6) Dampers.
 - 7) Ductwork.

B. System Applications:

1. Automatic System Database Save and Restore Functions:
 - a. Current database copy of each Building Controller is automatically stored on web.
 - b. Automatic update occurs upon change in any system panel.
2. Manual System Database Save and Restore Functions by Operator with Password Clearance:
 - a. Save database from any system panel.
 - b. Clear a panel database.

- c. Initiate a download of a specified database to any system panel.
- 3. Software provided allows system configuration and future changes or additions by operators under proper password protection.
- 4. On-line Help:
 - a. Context-sensitive system assists operator in operation and editing.
 - b. Available for all applications.
 - c. Relevant screen data provided for particular screen display.
 - d. Additional help available via hypertext.
- 5. Security:
 - a. Operator log-on requires user name and password to view, edit, add, or delete data.
 - b. System security selectable for each operator.
 - c. System supervisor sets passwords and security levels for all other operators.
 - d. Operator passwords to restrict functions accessible to viewing and/or changing system applications, editor, and object.
 - e. Automatic, operator log-off results from keyboard or mouse inactivity during user-adjustable, time period.
 - f. All system security data stored in encrypted format.
- 6. System Diagnostics:
 - a. Operations Automatically Monitored:
 - 1) Modems.
 - 2) Network connections.
 - 3) Building management panels.
 - 4) Controllers.
 - b. Device failure is annunciated to the operator.
- 7. Alarm Processing:
 - a. All system objects are configurable to "alarm in" and "alarm out" of normal state.
 - b. Configurable Objects:
 - 1) Alarm limits.
 - 2) Alarm limit differentials.
 - 3) States.
 - 4) Reactions for each object.
- 8. Alarm Messages:
 - a. Descriptor: English language.
 - b. Recognizable Features:
 - 1) Source.
 - 2) Location.
 - 3) Nature.
- 9. Configurable Alarm Reactions by Operator and Time of Day:
 - a. Logging.
 - b. Printing.
 - c. Starting programs.
 - d. Displaying messages.
 - e. Dialing out to remote locations.
 - f. Paging.
 - g. Providing audible annunciation.
 - h. Displaying specific system graphics.
- 10. Custom Trend Logs:

- a. Definable for any data object in the system including interval, start time, and stop time.
 - b. Trend Data:
 - 1) Sampled and stored on the building controller panel.
 - 2) Archivable on hard disk.
 - 3) Retrievable for use in reports, spreadsheets and standard database programs.
 - 4) Archival on LAN accessible storage media including hard disk, tape, Raid array drive, and virtual cloud environment.
 - 5) Protected and encrypted format to prevent manipulation, or editing of historical data and event logs.
11. Alarm and Event Log:
- a. View all system alarms and change of states from any system location.
 - b. Events listed chronologically.
 - c. Operator with proper security acknowledges and clears alarms.
 - d. Alarms not cleared by operator are archived to the workstation hard disk.
12. Object, Property Status and Control:
- a. Provide a method to view, edit if applicable, the status of any object and property in the system.
 - b. Status Available by the Following Methods:
 - 1) Menu.
 - 2) Graphics.
 - 3) Custom Programs.
13. Reports and Logs:
- a. Reporting Package:
 - 1) Allows operator to select, modify, or create reports.
 - 2) Definable as to data content, format, interval, and date.
 - 3) Archivable to hard disk.
 - b. Real-time logs available by type or status such as alarm, lockout, normal, etc.
 - c. Stored on hard disk and readily accessible by standard software applications, including spreadsheets and word processing.
 - d. Set to be printed on operator command or specific time(s).
14. Reports:
- a. Standard:
 - 1) Objects with current values.
 - 2) Current alarms not locked out.
 - 3) Disabled and overridden objects, points and SNVTs.
 - 4) Objects in manual or automatic alarm lockout.
 - 5) Objects in alarm lockout currently in alarm.
 - 6) Logs:
 - a) Alarm History.
 - b) System messages.
 - c) System events.
 - d) Trends.
 - b. Custom:
 - 1) Daily.
 - 2) Weekly.
 - 3) Monthly.

- 4) Annual.
 - 5) Time and date stamped.
 - 6) Title.
 - 7) Facility name.
 - c. Tenant Override:
 - 1) Monthly report showing total, requested, after-hours HVAC and lighting services on a daily basis for each tenant.
 - 2) Annual report showing override usage on a monthly basis.
 - d. Weather:
 - 1) Weather:
 - a) Monthly showing minimum, maximum, average outdoor air temperature and heating/cooling degree-days for the month.
- C. Applications Editors:
- 1. Provide editing software for each system application.
 - 2. Downloaded application is executed at controller panel.
 - 3. Full screen editor for each application allows operator to view and change:
 - a. Configuration.
 - b. Name.
 - c. Control parameters.
 - d. Set-points.
 - 4. Scheduling:
 - a. Monthly calendar indicates schedules, holidays, and exceptions.
 - b. Allows several related objects to be scheduled and copied to other objects or dates.
 - c. Start and stop times adjustable from master schedule.
 - 5. Custom Application Programming:
 - a. Create, modify, debug, edit, compile, and download custom application programming during operation and without disruption of all other system applications.
 - b. Programming Features:
 - 1) English oriented language, based on BASIC, FORTRAN, C, or PASCAL syntax allowing for free form programming.
 - 2) Alternative language graphically based using appropriate function blocks suitable for all required functions and amenable to customizing or compounding.
 - 3) Insert, add, modify, and delete custom programming code that incorporates word processing features such as cut/paste and find/replace.
 - 4) Allows the development of independently, executing, program modules designed to enable and disable other modules.
 - 5) Debugging/simulation capability that displays intermediate values and/or results including syntax/execution error messages.
 - 6) Support for conditional statements (IF/THEN/ELSE/ELSE-F) using compound Boolean (AND, OR, and NOT) and/or relations (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.
 - 7) Support for floating-point arithmetic utilizing plus, minus, divide, times, square root operators; including absolute value; minimum/maximum value from a list of values for mathematical functions.

- 8) Language consisting of resettable, predefined, variables representing time of day, day of the week, month of the year, date; and elapsed time in seconds, minutes, hours, and days where the variable values can be used in IF/THEN comparisons, calculations, programming statement logic, etc.
- 9) Language having predefined variables representing status and results of the system software enables, disables, and changes the set points of the controller software.

2.8 CONTROLLER SOFTWARE

- A. All applications reside and operate in the system controllers and editing of all applications occurs at the operator workstation.
- B. System Security:
 1. User access secured via user passwords and user names.
 2. Passwords restrict user to the objects, applications, and system functions as assigned by the system manager.
 3. User Log On/Log Off attempts are recorded.
 4. Automatic Log Off occurs following the last keystroke after a user defined delay time.
- C. Object or Object Group Scheduling:
 1. Weekly Schedules Based on Separate, Daily Schedules:
 - a. Include start, stop, optimal stop, and night economizer.
 - b. 10 events maximum per schedule.
 - c. Start/stop times adjustable for each group object.
 2. Holiday or Special Schedules:
 - a. Capability to define up to 99 schedules.
 - b. Repeated annually.
 - c. Length of each period is operator defined.
- D. Provide standard application for equipment coordination and grouping based on function and location to be used for scheduling and other applications.
- E. Alarms:
 1. Binary object is set to alarm based on the operator specified state.
 2. Analog object to have high/low alarm limits.
 3. All alarming is capable of being automatically and manually disabled.
 4. Alarm Reporting:
 - a. Operator determines action to be taken for alarm event.
 - b. Alarms to be routed to appropriate workstation.
 - c. Reporting Options:
 - 1) Logged.
 - 2) Graphical displays.
- F. Maintenance Management: System monitors equipment status and generates maintenance messages based upon user-designated run-time limits.
- G. Sequencing: Application software based upon specified sequences of operation in Section 23 0993.

- H. PID Control Characteristics:
 - 1. Direct or reverse action.
 - 2. Anti-windup.
 - 3. Calculated, time-varying, analog value, positions an output or stages a series of outputs.
 - 4. User selectable controlled variable, set-point, and PED gains.
- I. Staggered Start Application:
 - 1. Prevents all controlled equipment from simultaneously restarting after power outage.
 - 2. Order of equipment startup is user selectable.
- J. Energy Calculations:
 - 1. Accumulated instantaneous power or flow rates are converted to energy use data.
 - 2. Algorithm calculates a rolling average and allows window of time to be user specified in minute intervals.
 - 3. Algorithm calculates a fixed window average with a digital input signal from a utility meter defining the start of the window period that in turn synchronizes the fixed-window average with that used by the power company.
- K. Anti-Short Cycling:
 - 1. All binary output objects protected from short-cycling.
 - 2. Allows minimum on-time and off-time to be selected.
- L. On-Off Control with Differential:
 - 1. Algorithm allows binary output to be cycled based on a controlled variable and set-point.
 - 2. Algorithm to be direct-acting or reverse-acting incorporating an adjustable differential.
- M. Run-Time Totalization:
 - 1. Totalize run-times for all binary input objects.
 - 2. Provides operator with capability to assign high run-time alarm.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.2 INSTALLATION

- A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.
- B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 23 0993.

- C. Provide conduit and electrical wiring in accordance with Section 26 0583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

3.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate complete and operating system to Owner.

3.5 MAINTENANCE

- A. Provide service and maintenance of energy management and control systems for one years from Date of Substantial Completion.
- B. Provide two complete inspections, one in each season, to inspect, calibrate, and adjust controls as required, and submit written reports.

END OF SECTION 23 0923

SECTION 23 1123 - 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 09 9113 - Exterior Painting.
- B. Section 23 0516 - Expansion Fittings and Loops for HVAC Piping.
- C. Section 23 0548 - Vibration and Seismic Controls for HVAC.
- D. Section 23 0553 - Identification for HVAC Piping and Equipment.

1.3 REFERENCE STANDARDS

- A. ANSI Z21.18/CSA 6.3 - Gas Appliance Pressure Regulators; 2019 (Reaffirmed 2024).
- B. ANSI Z21.80/CSA 6.22 - Line Pressure Regulators; 2019 (Reaffirmed 2024).
- C. ANSI Z223.1 - National Fuel Gas Code; 2024.
- D. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.
- E. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- F. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- G. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2024.
- H. ASME B31.1 - Power Piping; 2024.
- I. ASME B31.9 - Building Services Piping; 2025.
- J. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2025, with Errata.
- K. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.
- L. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- M. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2025.
- N. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

- O. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- P. ASTM B813 - Standard Specification for Water Flushable Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2024.
- Q. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2023.
- R. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2026.
- S. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2018.
- T. MSS SP-78 - Gray Iron Plug Valves, Flanged and Threaded Ends; 2026.
- U. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .

1.4 SUBMITTALS

- A. See Section 01 3000 - 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. Welders' Certificates: Submit certification of welders' 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.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

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. Welder Qualifications: Certified in accordance with ASME BPVC-IX.
- D. Identify pipe with marking including size, ASTM material classification, and ASTM specification.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. 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 NATURAL GAS PIPING, BURIED

- A. Steel Pipe: ASTM A53/A53M, Grade B, Type E, Schedule 40 black.
 - 1. Fittings: ASTM A234/A234M, wrought steel welding type.
 - 2. Joints: ANSI Z223.1, welded.
 - 3. Jacket: AWWA C105/A21.5 polyethylene jacket or double layer, half-lapped 10 mil polyethylene tape.
- B. Copper Tubing: Listed, ASTM B88 (ASTM B88M), Type L (B), annealed.
 - 1. Fittings: ASME B16.18 cast copper or ASME B16.22 wrought copper.
 - 2. Joints: Compression connection or AWS A5.8M/A5.8, BCuP silver braze.
- C. Polyethylene Pipe: ASTM D2513, SDR 11
 - 1. Fittings: ASTM D2683 or ASTM D2513 socket type.
 - 2. Joints: Fusion welded.

2.2 NATURAL GAS PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Grade B, Type E, 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.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B) annealed.
 - 1. Fittings: Flared: ASME B16.26, cast bronze, Copper: ASME B16.22, wrought copper

2.3 FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 Inches and Under:
 - 1. Ferrous Pipe: Class 150 malleable iron threaded unions.
 - 2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
- B. Flanges for Pipe Size Over 1 Inch:
 - 1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
 - 2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

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.
 - 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.

2.5 BALL VALVES

- A. Manufacturers:
 1. BrassCraft Manufacturing Co.; a Masco Company
 2. Conbraco Industries, Inc.
 3. Lyall, R W & Company, Inc
- B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 600 psi CWP, brass or bronze body, 304 stainless steel or chrome plated brass ball, regular port, Teflon seats and stuffing box ring, blowout proof stem, lever handle, solder or threaded ends with union.

2.6 PLUG VALVES

- A. Construction 2-1/2 Inches and Larger: MSS SP-78, 175 psi CWP, cast iron body and plug, pressure lubricated, Teflon or Buna N packing, flanged ends. Provide lever operator with set screw.

2.7 STRAINERS

- A. Size 2 inch and Under:
 1. Threaded brass body for 175 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
 2. Class 150, threaded bronze body 300 psi CWP, Y pattern with 1/32 inch stainless steel perforated screen.
- B. Size 2-1/2 inch to 4 inch:
 1. Class 125, flanged iron body, Y pattern with 1/16 inch stainless steel perforated screen.

2.8 LINE PRESSURE REGULATORS AND APPLIANCE REGULATORS INDICATORS

- A. Manufacturers:
 1. American Meter Company
 2. Fisher Control Valves & Instruments, an Emerson Process Management brand
 3. Maxitrol Company
- 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.
- D. Maximum Inlet Operating Pressure: 10 psi.
 - 1. Appliance Regulator: 2 psi.
 - 2. Line Pressure Regulator: 10 psi.

2.9 PIPING SPECIALTIES

- A. Appliance flexible connectors:
 - 1. Indoor, fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
 - 2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
 - 3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
 - 4. Corrugated stainless-steel tubing with polymer coating.
- B. Operating-Pressure Rating: 0.5 psig.
 - 1. End Fittings: Zinc-coated steel.
 - 2. Threaded Ends: Comply with ASME B1.20.1.
 - 3. Maximum Length: 72 inches
- C. Quick-Disconnect Devices: Comply with ANSI Z21.41.
 - 1. Copper-allow convenience outlet and matching plug connector
 - 2. Nitrile seals.
 - 3. Hand operated with automatic shutoff when disconnected.
 - 4. For indoor or outdoor applications.
 - 5. Adjustable, retractable restraining cable.
- D. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.
- E.
- F. Joint Compound and Tape: Suitable for natural gas.
- G. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.10 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

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 23 0516.
- 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. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
 - 1. Painting of interior piping systems and components is specified in Section 09 9123.
 - 2. Painting of exterior piping systems and components is specified in Section 09 9113.
- L. Install valves with stems upright or horizontal, not inverted.
- M. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- N. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813.
- O. Sleeve pipes passing through partitions, walls and floors.
- P. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9.
2. Support horizontal piping as indicated.
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. Provide copper plated hangers and supports for copper piping.
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.
 - a. Painting of exterior piping systems and components is specified in Section 09 9113.
8. Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 23 0548.

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 ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Install ball valves for throttling, bypass, or manual flow control services.

3.5 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
 2. Cut threads full and clean using sharp dies.
 3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
 1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
 2. Bevel plain ends of steel pipe.
 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

- F. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.
- G. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.6 LABELING AND IDENTIFYING

- A. Comply with requirements in Section 23 0553 "Identification for HVAC Piping & Equipment" for piping and valve identification.
- B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.7 FIELD QUALITY CONTROL

- A. Test, inspect, and purge natural gas according to NFPA 54 and the International Fuel Gas Code and authorities having jurisdiction.
- B. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.8 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.
 - e. Pipe Size: 8 inches to 12 inches:
 - 1) Maximum Hanger Spacing: 14 ft.
 - 2) Hanger Rod Diameter: 7/8 inch.
 - f. Pipe Size: 14 inches and Over:
 - 1) Maximum Hanger Spacing: 20 ft.
 - 2) Hanger Rod Diameter: 1 inch.
- B. Outdoor Piping

1. Aboveground natural-gas piping shall be one of the following:
 - a. Steel pipe with malleable-iron fittings and threaded joints for pipes smaller than 2-1/2”.
 - b. Steel pipe with wrought-steel fittings and welded joints for pipes 2-1/2” and larger.
 2. Paint all exterior piping with two coats of exterior paint with color selected by Architect.
- C. Indoor Piping
1. Aboveground, distribution piping shall be one of the following:
 - a. Steel pipe with malleable-iron fittings and threaded joints for pipes smaller than 2-1/2”..
 - b. Steel pipe with wrought-steel fittings and welded joints for pipes 2-1/2” and larger.
 2. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
 3. Containment Conduit Vent Piping: Steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.
- D. Aboveground Manual Gas Shutoff Valve
1. Valves for pipe sizes NPS 2 and smaller at service meter shall be one of the following:
 - a. Two-piece, full -port, bronze ball valves with bronze trim.
 - b. Bronze plug valve.
 2. Distribution piping valves for pipe sizes NPS 2 and smaller shall be one of the following:
 - a. Two-piece, full -port, bronze ball valves with bronze trim.
 - b. Bronze plug valve.
 3. Valves in branch piping for single appliance shall be one of the following:
 - a. Two-piece, full -port, bronze ball valves with bronze trim.
 - b. Bronze plug valve.

END OF SECTION 23 1123

SECTION 23 2113 - HYDRONIC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hydronic system requirements.
- B. Heating water piping, buried.
- C. Heating water piping, above grade.
- D. Chilled water piping, buried.
- E. Chilled water piping, above grade.
- F. Radiant heating piping system.
- G. Pipe hangers and supports.
- H. Unions, flanges, mechanical couplings, and dielectric connections.

1.2 RELATED REQUIREMENTS

- A. Section 08 3100 - Access Doors and Panels.
- B. Section 09 9123 - Interior Painting.
- C. Section 23 0516 - Expansion Fittings and Loops for HVAC Piping.
- D. Section 23 0719 - HVAC Piping Insulation.
- E. Section 23 2500 - HVAC Water Treatment: Pipe cleaning.

1.3 REFERENCE STANDARDS

- A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.
- B. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 Through NPS 24 Metric/Inch Standard; 2025.
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- E. ASME B31.9 - Building Services Piping; 2025.
- F. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2025, with Errata.
- G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

- H. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
 - I. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2025.
 - J. ASTM A536 - Standard Specification for Ductile Iron Castings; 2024.
 - K. ASTM B32 - Standard Specification for Solder Metal; 2020.
 - L. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
 - M. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
 - N. ASTM D2774 - Standard Practice for Underground Installation of Thermoplastic Pressure Piping; 2025.
 - O. ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing; 2026.
 - P. ASTM F877 - Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems; 2025.
 - Q. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2024).
 - R. ASTM F1960 - Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-Linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing; 2024.
 - S. ASTM F2389 - Standard Specification for Pressure-Rated Polypropylene (PP) Piping Systems; 2024a.
 - T. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2026.
 - U. AWS D10.12M/D10.12 - Guide for Welding Mild Steel Pipe; 2000.
 - V. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2018.
 - W. AWWA C606 - Grooved and Shouldered Joints; 2022.
 - X. DIN 4726 - Warm Water Surface Heating Systems and Radiator Connections - Plastics and Multilayer Piping Systems; 2024.
 - Y. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2025.
- 1.4 SUBMITTALS
- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
 - B. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.
 - C. Product Data:
 - 1. Include data on pipe materials, pipe fittings, valves, and accessories.
 - 2. Provide manufacturers catalog information.

- D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- E. Project Record Documents: Record actual locations of valves.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.

1.5 QUALITY ASSURANCE

- A. Provide all grooved joint couplings, fittings, valves, specialties, and grooving tools from a single manufacturer.
- B. Welder Qualifications: Certify in accordance with ASME BPVC-IX.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary protective coating on cast iron and steel valves.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. 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 HYDRONIC SYSTEM REQUIREMENTS

- A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
- B. Piping: Provide piping, fittings, hangers, and supports as required, as indicated, and as follows:
 - 1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
 - 2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
 - 3. Grooved mechanical joints may be used in accessible locations only.
 - a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Architect.
 - b. Grooved mechanical connections and joints comply with AWWA C606.
 - 1) Ductile Iron: Comply with ASTM A536, Grade 65-45-12.
 - c. Use rigid joints unless otherwise indicated.
 - 4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.
- C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
- D. Valves: Provide valves where indicated:

1. Provide drain valves where indicated, and if not indicated, provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate valves with cap; pipe to nearest floor drain.
2. For throttling, bypass, or manual flow control services, use globe, ball, or butterfly valves.
3. For shut-off and to isolate parts of systems or vertical risers, use ball or butterfly valves.

E. Welding Materials and Procedures: Comply with ASME BPVC-IX.

2.2 HEATING WATER PIPING, BURIED

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, with AWWA C105/A21.5 polyethylene jacket, or double layer, half-lapped polyethylene tape.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), annealed.
 1. Fittings: ASME B16.22, wrought copper.
 2. Joints: Braze, AWS A5.8M/A5.8 BCuP copper/silver alloy.
 3. Casing: Polyurethane insulation with high density polyethylene jacket and heat shrink sleeves.
- C. Pressure-Rated Polypropylene Pipe: ASTM D2774 or ASTM F2389, PP-RCT resin pipe with fiber layer, SDR 11 or SDR 9.
 1. Fittings: ASTM F2389, butt, socket, or saddle-weld heat fusion. Transitions to comply with ASTM F1960 or ASME B16.5.

2.3 HEATING WATER PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
 1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D10.12M/D10.12 welded.
 2. Threaded Joints: ASME B16.3, malleable iron fittings.
 3. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types:
 1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
 - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
 - b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.
- C. Pressure-Rated Polypropylene Pipe: ASTM D2774 or ASTM F2389, PP-RCT resin pipe with fiber layer, SDR 11 or SDR 9.
 1. Fittings: ASTM F2389, butt, socket, or saddle-weld heat fusion. Transitions to comply with ASTM F1960 or ASME B16.5.
 2. Manufacturers:
 - a. Aquatherm
 - b. Aquatechnik
 - c. Niron
 - d. Uponor

2.4 CHILLED WATER PIPING, BURIED

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black with AWWA C105/A21.5 polyethylene jacket, or double layer, half-lapped polyethylene tape.
 - 1. Fittings: ASTM A234/A234M, wrought steel welding type with double layer, half-lapped polyethylene tape.
 - 2. Joints: Welded in accordance with AWS D10.12M/D10.12.
 - 3. Casing: Closed glass cell insulation.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A) annealed.
 - 1. Fittings: ASME B16.22, wrought copper.
 - 2. Joints: Solder, lead-free, ASTM B32 HB alloy (95-5 tin-antimony), or tin and silver.
 - 3. Casing: Closed glass cell insulation.
- C. Pressure-Rated Polypropylene Pipe: ASTM D2774 or ASTM F2389, PP-RCT resin pipe with fiber layer, SDR 11.
 - 1. Fittings: ASTM F2389, butt, socket, or saddle-weld heat fusion. Transitions to comply with ASTM F1960 or ASME B16.5.
 - 2. Manufacturers:
 - a. Uponor, Inc.
 - b. Aquatherm.
 - c. Aquatechnik.
 - d. Niron.

2.5 CHILLED WATER PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black; using one of the following joint types:
 - 1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D10.12M/D10.12 welded.
 - 2. Threaded Joints: ASME B16.3, malleable iron fittings.
 - 3. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), hard drawn; using one of the following joint types:
 - 1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22, solder wrought copper fittings.
 - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
 - b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.

2.6 RADIANT HEATING PIPING

- A. Cross-Linked Polyethylene (PEX-a) Pipe: ASTM F876 or ASTM F877.
 - 1. Manufacturers:
 - a. Rehau, Inc
 - b. Wirsbo Co./Uponor
 - c. Mr. Pex
 - d. Heat Link
 - 2. Oxygen Barrier: Limit oxygen diffusion through the tube to maximum 0.000044 grains per cu ft/day at 104 degrees F in accordance with DIN 4726.

2.7 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. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge-shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.
- C. 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:
 - 1. Bases: High-density polypropylene.
 - 2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 - 3. Steel Components: Stainless steel or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
 - 4. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion-resistant material.
 - 5. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

2.8 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

- A. Unions for Pipe of 2 Inches and Less:
 - 1. Ferrous Piping: 150 psi brass or malleable iron, threaded.
 - 2. Copper Pipe: Bronze, soldered joints.
- B. Flanges for Pipe 2-1/2 Inches and Greater (equipment connections, valves, and where welding not feasible):
 - 1. Ferrous Piping: 150 psig forged steel, slip-on.
- C. 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. Mechanical Couplings: Comply with ASTM F1476.
 - 3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
 - 4. When pipe is field grooved, provide coupling manufacturer's grooving tools.
- D. Dielectric Connections:
 - 1. Unions:
 - a. 1/2 to 1 Inches: Brass solder to galvanized FPT.
 - b. 1/2 to 2 Inches: Brass solder to galvanized FPT.
 - c. 1/2 to 1 Inches: Brass to galvanized FPT or FIP (Female Iron Pipe).
 - d. 3/4 to 1/2 Inch Reducer: Brass solder to galvanized FPT.
 - e. Service: 250 psi, minus 20 to 180 deg F.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare piping connections to equipment using jointing system specified.
- E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.
- F. After completion, fill, clean, and treat systems. See Section 23 2500 for additional requirements.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. PP-RCT Pipe: Make heat fusion joint per manufacturers instructions.
- C. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- D. Install piping to conserve building space and to avoid interference with use of space.
- E. Group piping whenever practical at common elevations.
- F. Sleeve pipe passing through partitions, walls, and floors.
- G. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified.
- H. Slope piping and arrange to drain at low points.
- I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. See Section 23 0516.
- J. Grooved Joints:
 - 1. Install in accordance with the manufacturer's latest published installation instructions.
 - 2. Gaskets to be suitable for the intended service, molded, and produced by the coupling manufacturer.
- K. Pipe Hangers and Supports:
 - 1. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.
 - 2. Place hangers within 12 inches of each horizontal elbow.
 - 3. Use hangers with 1-1/2 inches 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.
 6. Install the following pipe attachments:
 - a. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet long.
 - b. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet or longer.
 - c. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 - d. Spring hangers to support vertical runs.
 - e. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
 - f. On plastic pipe, install pads or cushions on bearing surfaces to prevent hanger from scratching pipe.
 7. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:
 - a. NPS 3/4: Maximum span, 7 feet.
 - b. NPS 1: Maximum span, 7 feet.
 - c. NPS 1-1/2: Maximum span, 9 feet.
 - d. NPS 2: Maximum span, 10 feet.
 - e. NPS 2-1/2: Maximum span, 11 feet.
 - f. NPS 3 and Larger: Maximum span, 12 feet.
 8. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:
 - a. NPS 3/4: Maximum span, 5 feet; minimum rod size, 1/4 inch.
 - b. NPS 1: Maximum span, 6 feet; minimum rod size, 1/4 inch.
 - c. NPS 1-1/4: Maximum span, 7 feet; minimum rod size, 3/8 inch.
 - d. NPS 1-1/2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 - e. NPS 2: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 - f. NPS 2-1/2: Maximum span, 9 feet; minimum rod size, 3/8 inch.
 - g. NPS 3 and Larger: Maximum span, 10 feet; minimum rod size, 3/8 inch.
 9. Plastic Piping Hanger Spacing: Space hangers according to pipe manufacturer's written instructions for service conditions. Avoid point loading. Space and install hangers with the fewest practical rigid anchor points.
 10. Support vertical runs at roof, at each floor, and at 10-foot intervals between floors.
- L. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. See Section 23 0719.
 - M. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 3100 .
 - N. Use eccentric reducers to maintain top of pipe level.
 - O. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welds.
 - P. Prepare unfinished pipe, fittings, supports, and accessories, ready for finish painting. See Section 09 9123.
 - Q. Install valves with stems upright or horizontal, not inverted.

3.3 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples or unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4 : Use dielectric flanges or nipples.

3.4 PIPING APPLICATIONS

- A. Hot Water and Chilled Water, NPS 1 and Smaller: Aboveground exposed in Mechanical room and at terminal heating and cooling devices only, use one of the following:
 - 1. Type L (Type B) drawn-temper copper tubing with soldered joints.
 - 2. Schedule 40 steel pipe with threaded joints.
 - 3. All main hydronic heating and cooling piping shall be:
 - a. Schedule 40 steel pipe
- B. Hot Water and Chilled Water, NPS 1-1/4 to NPS 2: Aboveground exposed in Mechanical room and at terminal heating and cooling devices only, use one of the following:
 - 1. Type L (Type B) drawn-temper copper tubing with soldered joints.
 - 2. Schedule 40 steel pipe with threaded joints.
 - 3. All main hydronic heating and cooling piping shall be:
 - a. Schedule 40 steel pipe.
- C. Hot Water and Chilled Water, NPS 2-1/2 and Larger:
 - 1. Schedule 40 steel pipe with welded joints. Flanges allowed at equipment, valves, and other required connections where welding is not feasible.
 - 2. Grooved mechanical-joint couplings (accessible locations only).
- D. Exterior Chilled Water, NPS 2 and Smaller: Schedule 40 steel pipe with threaded joints. No grooved piping allowed on exterior piping.
- E. Exterior Chilled Water, NPS 2-1/2 and Larger: Schedule 40 steel pipe with welded joints. Flanges allowed at equipment, valves, and other required connections where welding is not feasible. No grooved piping allowed on exterior piping.
- F. Buried Pipe: As specified in Part 2.2.
- G. Condensate-Drain Piping: Type L (Type B) drawn-temper copper tubing with soldered joints.

3.5 TERMINAL EQUIPMENT CONNECTIONS

- A. Sizes for supply and return piping connections shall be the same as or larger than equipment connections.
- B. Install control valves in accessible locations close to connected equipment.
- C. Install bypass piping with globe valve around control valve. If parallel control valves are installed, only one bypass is required.
- D. Install ports for pressure gages and thermometers at coil inlet and outlet connections. Comply with requirements in Section 200519 "Meters and Gages for Piping."

3.6 CHEMICAL TREATMENT

- A. See section 23 2513 "Water Treatment for Closed-Loop Hydronic Systems".

3.7 FIELD QUALITY CONTROL

- A. Prepare hydronic piping according to ASME B31.9 and as follows:
 - 1. Leave joints, including welds, uninsulated and exposed for examination during test.
 - 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
 - 3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
 - 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
 - 5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.
- B. Perform the following tests on hydronic piping:
 - 1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
 - 2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
 - 3. Isolate expansion tanks and determine that hydronic system is full of water.
 - 4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times the "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
 - 5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
 - 6. Prepare written report of testing.
- C. Perform the following before operating the system:
 - 1. Open manual valves fully.
 - 2. Inspect pumps for proper rotation.
 - 3. Set makeup pressure-reducing valves for required system pressure.
 - 4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
 - 5. Set temperature controls so all coils are calling for full flow.
 - 6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
 - 7. Verify lubrication of motors and bearings.

END OF SECTION 23 2113

SECTION 23 2114 - HYDRONIC SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Expansion tanks.
- B. Air vents.
- C. Air separators.
- D. Strainers.
- E. Magnetic filters.
- F. Suction diffusers.
- G. Balancing valves.
- H. Flow meters.

1.2 REFERENCE STANDARDS

- A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2025, with Errata .

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.
- C. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. 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 EXPANSION TANKS

- A. Manufacturers:
 - 1. American Wheatley, a company of Global Flow Products, LLC; _____: www.wheatleyhvac.com/#sle.
 - 2. Bell & Gossett, a brand of Xylem, Inc
 - 3. Taco, Inc
 - 4. Grundfos.
- B. Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, adjustable flexible EPDM diaphragm or bladder seal factory precharged to 12 psi, and steel support stand , unless otherwise noted on the plans. .
- C. Automatic Cold Water Fill Assembly: Pressure reducing valve, reduced pressure double check backflow preventer, test cocks, strainer, vacuum breaker, and valved by-pass.

2.2 AIR VENTS

- A. Manual Air Vent: Short vertical sections of 2-inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.
- B. Float Air Vent:
 - 1. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.
- C. Maximum Fluid Pressure: 150 psi.
- D. Maximum Fluid Temperature: 250 degrees F.

2.3 AIR SEPARATORS

- A. In-line Air Separators:
 - 1. Manufacturers:
 - a. Armstrong International, Inc
 - b. Bell & Gossett, a brand of Xylem, Inc
 - c. Nexus Valve, Inc; _____: www.nexusvalve.com/#sle.
 - d. Taco, Inc
 - e. Spirotherm.
 - f. Grundfos.
 - 2. Cast iron for sizes 1-1/2 inch and smaller, or steel for sizes 2 inch and larger; tested and stamped in accordance with ASME BPVC-VIII-1; for 125 psi operating pressure.
 - 3. Maximum Allowable Service Temperature: 450 degrees F.
- B. Centrifugal Air Separators/Strainers:
 - 1. Manufacturers:
 - a. Armstrong International, Inc
 - b. Bell & Gossett, a brand of Xylem, Inc
 - c. Taco, Inc

2. Primed steel body, tested and stamped in accordance with ASME BPVC-VIII-1 with integral bronze strainer, tangential flanged inlet and outlet connections, and internal stainless steel air collector tube.
3. Maximum Service Flow and Pressure: 16 gpm at 125 psi.

2.4 STRAINERS

- A. Size 2 inch and Under:
 1. Provide threaded or sweat brass or iron body for up to 175 psi working pressure, Y-pattern strainer with 1/32 inch stainless steel perforated screen.
- B. Size 2-1/2 inch to 4 inch:
 1. Provide flanged or grooved iron body for up to 175 psi working pressure, up to 250 degrees F working temperature, Y-pattern strainer with 1/16 inch or 3/64 inch stainless steel perforated screen.
- C. Size 5 inch and Larger:
 1. Provide flanged or grooved iron body for up to 175 psi working pressure, basket pattern with 1/8 inch stainless steel perforated screen.
- D. Accessories: Provide air vent, hanging tag, outlet ball valve, and PT test plug extension.

2.5 MAGNETIC FILTERS

- A. Manufacturers:
 1. ADEY Innovation LLC
 2. Wessels Company.
 3. BoilerMag.
- B. Description: ASME BPVC-VIII-1 compliant, packaged oxide filtration assembly configured to remove dissolved ferrous metals from hydronic systems.
- C. Performance:
 1. Maximum Design Temperature: 250°F
 2. Maximum Design Pressure: 150 PSIG
- D. Construction:
 1. Shell: Carbon Steel Exterior
 2. Coalescing Medium: Stainless Steel
 3. Magnet: Neodymium
- E. Options:
 1. Bronze Blow Down Valve
 2. Bronze Skim Valve
 3. Cast Iron Vent

2.6 SUCTION DIFFUSERS

- A. See Section 23 2123 Hydronic Pumps

2.7 PUMP CONNECTORS

- A. Flexible Connectors: Flanged, braided type with wetted components of stainless steel, sized to match piping.
 - 1. Maximum Operating Service: 150 psi at 240 degrees F.
 - 2. End Connections: Same as specified for pipe jointing.
 - 3. Provide necessary accessories including, but not limited to, swivel joints.

2.8 BALANCING VALVES

- A. Manufacturers:
 - 1. Bell & Gossett, a brand of Xylem, Inc
 - 2. Hays Fluid Controls; _____: www.haysfluidcontrols.com/#sle.
 - 3. Nexus Valve, Inc; _____: www.nexusvalve.com/#sle.
 - 4. Pro Hydronic Specialties.
 - 5. Hydronic Components Inc.
 - 6. Conbraco Industries, Inc.
 - 7. Spence Engineering Company, Inc.
 - 8. Watts, a Watts Water Technologies Company.
 - 9. IMI Flow Design.
- B. Size 2 inch and Smaller:
 - 1. Provide ball or globe style with flow balancing, shut-off capabilities, memory stops, and minimum of two metering ports and female sweat, NPT threaded, or soldered connections.
 - 2. Metal construction materials consist of bronze or brass.
 - 3. Non-metal construction materials consist of Teflon or EPDM.
- C. Size 2-1/2 inch and Larger:
 - 1. Provide butterfly style with flow balancing, shut-off capabilities, memory stops, and minimum of two metering ports and flanged, grooved, or weld-end connections.
 - 2. Valve body construction materials consist of cast iron, carbon steel, or ductile iron.
 - 3. Internal components construction materials consist of brass, aluminum bronze, bronze, Teflon, EPDM, or NORYL.

2.9 FLOW METERS

- A. Manufacturers:
 - 1. Dwyer Instruments, Inc
- B. Orifice principle by-pass circuit with direct reading gauge, soldered or flanged piping connections for 125 psi working pressure, with shut off valves, and drain and vent connections.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install specialties in accordance with manufacturer's instructions.
- B. Provide manual air vents at system high points and as indicated.

- C. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.
- D. Provide air separator on suction side of system circulation pump and connect to expansion tank.
- E. Provide valved drain and hose connection on strainer blowdown connection.
- F. Provide pump suction fitting on suction side of base-mounted centrifugal pumps where indicated. Remove temporary strainers after cleaning systems.
- G. Support pump fittings with floor-mounted pipe and flange supports.
- H. Provide relief valves on pressure tanks, low-pressure side of reducing valves, heat exchangers, and expansion tanks.
- I. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.
- J. Pipe relief valve outlet to nearest floor drain.
- K. Where one line vents several relief valves, make cross-sectional area equal to sum of individual vent areas.

END OF SECTION 23 2114

SECTION 23 2513 - WATER TREATMENT FOR CLOSED-LOOP HYDRONIC SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes the following water treatment for closed-loop hydronic systems:
 - 1. Approved companies and materials for hydronic systems.
 - 2. Approved chemical feeding and filtering equipment.
 - 3. De-ionized water requirements.
 - 4. Hydronic system fluid requirements.
 - 5. Preparation for hydronic system.
 - 6. Cleaning and filling sequence.
 - 7. Expansion tank installation guidelines.
 - 8. Hydronic system fluid testing.
 - 9. Warranty of hydronic system.

1.3 DEFINITIONS

- A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.
- B. RO: Reverse osmosis.
- C. TSS: Total suspended solids are solid materials, including organic and inorganic, that are suspended in the water. These solids may include silt, plankton, and industrial wastes.

1.4 ACTION SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, and furnished specialties and accessories for the following products:
 - 1. Hydronic system cleaner.
 - 2. Glycol.
 - 3. Inhibitors.
 - 4. System volume.
 - 5. Gage readings.
 - 6. Chemical material safety data sheets.

1.5 INFORMATIONAL SUBMITTALS

- A. Water Analysis Provider Qualifications: Verification of experience and capability of HVAC water-treatment service provider.
- B. Field quality-control reports.
- C. Other Informational Submittals:
 - 1. Water-Treatment Program: Written sequence of operation on an annual basis for the application equipment required to achieve water quality defined in "Performance Requirements" Article.
 - 2. Water Analysis: Illustrate water quality available at Project site.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For sensors, injection pumps, and controllers to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

- A. HVAC Water-Treatment Service Provider Qualifications: An experienced HVAC water-treatment service provider capable of analyzing water qualities, installing water-treatment equipment, and applying water treatment as specified in this Section.

1.8 REGULATORY REQUIREMENTS

- A. Conform to applicable code for addition of non-potable chemical to building mechanical system and to public sewage systems.
- B. Conform to Sewer Use Rules and Regulations published by Minot Municipal Utilities.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Contractor shall be responsible for the delivery, storage, protection and handling of the products before, during, and after installation.
- B. Contractor shall be responsible for accepting all products from the manufacturers of the equipment in factory-fabricated protective containers. Contractor shall inspect for damage.
- C. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.10 MAINTENANCE SERVICE

- A. Scope of Maintenance Service: Provide chemicals and service program to maintain water conditions required above to inhibit corrosion and scale formation for hydronic piping and equipment. The hydronic system fluid warranty period shall expire one year after warranty start date established by final fluid Acceptance or by the one year contractors warranty for the entire project, whichever is later.

- B. Services and chemicals shall include the following:
1. Initial water analysis and HVAC water-treatment recommendations.
 2. Startup assistance for Contractor to flush the systems, clean with detergents, and initially fill systems with required chemical treatment prior to operation.
 3. Periodic field service and consultation.
 4. Customer report charts and log sheets.
 5. Laboratory technical analysis.
 6. Analyses and reports of all chemical items concerning safety and compliance with government regulations.

PART 2 PRODUCTS

2.1 MANUFACTURERS (ALL NEW HEATING GLYCOL SOLUTION SHALL BE THE SAME MANUFACTURER AS THE EXISTING FLUID)

- A. Cleaning chemicals shall be designed for hydronic systems and compatible with pipes, fittings, coils, valves, equipment and etc.

2.2 DE-IONIZED WATER REQUIREMENTS (FOR FINAL RINSES AND FINAL FILL)

- A. Sulfate < 25 ppm
B. Chloride < 25 ppm
C. Calcium < 1 ppm
D. Magnesium < 1 ppm
E. Silica < 25 ppm
F. Electrical Conductivity < 5.0 umho/cm @ 77 degrees Fahrenheit
G. Total water hardness < 2 ppm

2.3 HYDRONIC SYSTEM FLUID REQUIREMENTS (FOR WATER OR GLYCOL SYSTEMS)

- A. Iron < 5 ppm
B. Copper < 2 ppm
C. Zinc < 5 ppm
D. Magnesium < 1 ppm
E. Calcium < 1 ppm
F. Silica < 25 ppm
G. Nitrate < 25 ppm
H. Molybdenum < 25 ppm

- I. Lead < 0.015 ppm
- J. Arsenic < 0.01 ppm
- K. Chloride < 25 ppm
- L. Sulfate < 25 ppm
- M. Acidity < 1000 ppm
- N. Phosphate, 2250-3750 ppm
- O. Boron > 150 ppm
- P. PH acceptable range: 8.0 to 9.5
- Q. Tolyltriazole > 150 ppm
- R. Reserve Alkalinity 3.0 to 6.0 mils/lite
- S. Sediments = none

2.4 PREPARATION FOR HYDRONIC SYSTEM

- 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. Systems containing any amount of glycol will not be allowed to be dumped down any sanitary waste line or on the ground. All glycol that is removed from a system shall be drained and disposed of properly or taken to an off-site location for recycling. Any damage caused by improper disposal of glycol, or subsequent remediation required, shall be at contractor's expense.
- D. Once system pressure is relieved, open air vents at high point(s) in the system to facilitate draining.
- E. If drain point doesn't exist at low point(s) in the system, contractor shall be responsible for installing one.
- F. Install a sample test line between the air separator and the suction side of the pump. Test line shall have a valve with a locking handle. See plans for details.
- G. Remove any strainer screens from the system, clean and replace.
- H. Permanently install a pressure gage at a high point in the system in a location approved by the Owner and Engineer. Record the location of pressure gage on the Record Drawings.
- I. Verify that electric power is available and of the correct characteristics.

2.5 CLEANING AND FILLING SEQUENCE

- A. Ensure all isolation valves, automatic control valves, etc. are wide open to facilitate complete filling of the system. Coordinate with temperature controls contractor as required to lock automatic control valves in open position during filling operation. Return control valves to automatic mode upon completion. Make sure expansion tank is valved off to the system.
- B. Install a water meter on the fill line to record the system volume.
- C. Fill system with water (use soft water if readily available at site, otherwise hard water is acceptable for this step). Contractor shall not use the system pumps to fill the hydronic system. Filling shall be done from a pump provided by contractor and shall connect to a low point in the system to facilitate air removal. Once system volume is known, add appropriate system cleaner. Refer to manufacturer's instructions on cleaner concentration, how long to circulate cleaner and at what temperature. Depending on cleanliness of hydronic system, more than one cleaning might be necessary to properly clean the hydronic system. In accordance with Sewer Use Rules and Regulations test all pH levels of water before draining the water and cleaner solution. Contractor shall adjust the pH levels as needed before draining the fluid. Drain the system down.
- D. Once the contractor has determined the cleaner has properly cleaned the hydronic system and pH levels meet the Sewer Use Rules and Regulations, fill and rinse the hydronic system with soft water) as many times as necessary in order to get clear, non-colored fluid. Meter all filling processes to insure an accurate system volume. During all rinse processes, contractor shall add chemical to prevent flash rusting. Remove all system strainer screens, clean and replace as many times as necessary throughout rinse process. Blowdown all equipment containing drain points where sediments may collect such as, air separators, boilers, chillers, etc. FINAL RINSE(S) shall be done with de-ionized water to insure that all calcium, magnesium, sulfate, and chloride ions left behind by flushing are removed. The hydronic system shall be filled with de-ionized water and rinsed as many times as necessary in order to insure the hydronic system fluid meets the de-ionized water requirements.
- E. Once the hydronic system meets the de-ionized water requirements, notify Engineer and Owner's Representative to demonstrate cleanliness and approve test results before filling the system. Using the metered volume obtained earlier, drain the required water in order to add the required glycol to achieve the specified level of protection as stated in the Hydronic System Fluid specifications.
- F. Refer to expansion tank installation guidelines before proceeding. Once the contractor has met the expansion tank guidelines, the hydronic system meets all of the requirements, then notify Owner's Representative. Within 7 days of notification, the Owner's representative will take a sample to be tested to show compliance with these specifications. Sample results may take 2-4 weeks. A copy of the sample results will be given to contractor along with recommendation, if needed, to meet the hydronic fluid requirements.

2.6 DIAPHRAGM EXPANSION TANK INSTALLATION GUIDELINES

- A. When filling a system keep the isolation valve between the system and the expansion tank closed.
- B. Fill system with system pumps off.

- C. Manually bleed air from system, as required, and circulate hydronic system as long as needed to ensure that all the air is out of the hydronic system.
- D. The gage pressure at the high point in the system shall read at least 6-8 psig . If no gage exists at the high point then install a gage wherever feasible. Once 6-8 psig is reached, stop filling. If you exceed 10 psig drain system fluid until 6-8 psig is reached.
- E. Record all pressure readings as indicated and the hydronic fluid temperatures with system pumps still off and at fill temperature. (It is understood that once the fill water is in the system the water temperature will try to reach the temperature of the surrounding environment. Throughout the diaphragm expansion tank installation guidelines the system fluid temperature will be referred to as fill temperature (before it gets heated or cooled by the mechanical equipment). Pressure reading can be from any gage at the low point of the system. When the pumps are off the suction and discharge pressure readings should be the same. if not check and repair pressure gages or gage line as needed.
- F. The pressure reading at the low point (with pumps off and system at fill temperature) is what you charge the air-side of the diaphragm tank. The expansion tank arrives from the manufacturer with an unknown charge. Test tank charge before adding compressed air or nitrogen. Testing tank charge can be done with a tire gage. Depending on hydronic system, you might have to lower expansion tank charge by releasing some air through the air port.
 - 1. Example: Assume pumps off and system at fill temperature. If the pressure reading at the low point in the system is 25 psig then charge the diaphragm tank, with dry compressed air or nitrogen, until 25 psig is reached in the tank.
- G. Once the expansion tank is charged with proper air-side pressure, open the isolation valve between the expansion tank and system.
- H. Turn on the appropriate number of systems pumps. Do not over pump the system by running backup pumps when not intended.
- I. Bleed air from system as required and add water or glycol as needed. Do not make any further adjustments to the expansion tank air-side pressure at this time. Continue to circulate fluid until contractor is satisfied that all air is bled from system.
- J. To insure that the expansion tank has been charged correctly, turn pumps off to system and leave the expansion tank online with the system.
- K. Check the pressure at the high point in the system. As long as the gage reading at the high point is between 4-8 psig, (if gage reading at the high point isn't at least 4 psig then add de-ionized water or proper glycol mixture to system until gage at high point is at least 6-8 psig.)
- L. If the pressure reading at the low point is +/- 2 psig of the air-side charge in the expansion tank then no changes needed and skip guidelines N-S.
- M. If the pressure reading at the low point (with pumps off and system at fill temperature) is greater than +/- 2 psig of the expansion tank air-side charge, then follow the below instructions.
- N. Valve off expansion tank from system.
- O. Open expansion tank fill port. This should release any water that might be in it.
- P. Close fill port.

- Q. Charge the expansion tank air-side charge (with pumps off and system at fill temperature) to the same pressure as the pressure reading from the low point of the system.
- R. Open valve and bring expansion tank back online with system.
- S. Start the appropriate number of pumps and bring the heating system within 10 degrees of the maximum leaving temperature and entering temperature. For cooling systems, start pumps and bring the cooling system within 5 degrees of the maximum leaving temperature and entering temperature. Coordinate with controls contractor and trades to assure systems are operated properly to achieve these temperatures.
- T. All data recorded shall be included in the Operation and Maintenance manuals.

2.7 HYDRONIC SYSTEM FLUID TESTING

- A. Contractor shall provide testing services by Dow Chemical Lab for the glycol heating systems prior to modifying any existing piping. Any adjustments required on the existing fluid will be at the Owners cost. Consult with the Engineer and Owner's project manager for recommendations. However, it solely remains the contractor's responsibility to bring the system into compliance, which may involve increasing the glycol concentration, adding more inhibitors, filtering out the sediment or complete draining, flushing and re-filling in accordance with these specifications.

2.8 WARRANTY OF HYDRONIC SYSTEM

- A. The hydronic system warranty shall commence with Final Acceptance of the building, but only if the sample results prove that the hydronic system meets de-ionized water and hydronic fluid requirements. If initial sample does not meet requirements, then contractor shall remediate as required and request additional sample(s) to be taken at the end of the remediation process.
Warranty period for the hydronic system shall not commence any sooner than final approved test result of hydronic system.
- B. After the hydronic system is initially approved, it shall be tested by Owner periodically during the warranty period to evaluate on-going condition of system. Contractor shall provide any necessary service and materials during the warranty period to maintain proper system pressure levels, glycol concentration, inhibitor concentrations, etc. to maintain system in accordance with these specifications.
- C. The hydronic system fluid warranty period shall expire one year after warranty start date established by final fluid Acceptance or by the one year contractors warranty for the entire project, whichever is later.

2.9 SCOPE OF WORK

- A. Heating System
 - 1. The Base Bid scope of work shall include a complete chemical cleaning as specified in this section of all new piping. Existing fluid type and concentration shall be sampled, tested, and report given to the engineer prior to any work being completed. Existing fluid shall be reused after testing is completed per section 3.4.A above. Contractor is responsible for all additional system fluid for the additional new piping system and equipment.

2.10 FINAL SYSTEM FLUID

- A. Final system fluid for the Heating Water System shall be 50% inhibited Ethylene glycol and 50% purified water solution.

2.11 INSTALLATION

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

END OF SECTION 23 2513

SECTION 23 3100 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ducts.
- B. Flexible ducts.
- C. Paint grip ducts.
- D. Ducts for laboratory and industrial-grade applications.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 09 9113 - Exterior Painting: Weld priming, weather resistant, paint or coating.
- C. Section 09 9123 - Interior Painting: Weld priming, paint or coating.
- D. Section 11 4000 - Foodservice Equipment: Kitchen range hoods.
- E. Section 23 0130.51 - HVAC Air-Distribution System Cleaning: Post install duct cleaning.
- F. Section 23 0548 - Vibration and Seismic Controls for HVAC.
- G. Section 23 0713 - Duct Insulation: External insulation and duct liner.
- H. Section 23 3300 - Air Duct Accessories.
- I. Section 23 3600 - Air Terminal Units.
- J. Section 23 3700 - Air Outlets and Inlets: Fabric air distribution devices.

1.3 REFERENCE STANDARDS

- A. ANSI Z9.5 - Laboratory Ventilation; 2022.
- B. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASHRAE Std 90.1 I-P-2019 - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2019, with Errata and Addenda (2021).
- D. ASHRAE Std 126 - Method of Testing HVAC Air Ducts; 2020.
- E. ASME AG-1 - Code on Nuclear Air and Gas Treatment; 2023.
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

- G. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2025b.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.
- I. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.
- J. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.
- K. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- L. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- M. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- N. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2026.
- O. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2024.
- P. ASTM E2336 - Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems; 2025.
- Q. ICC (IMC) - International Mechanical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2018, with Editorial Revision (2020).
- S. ICC-ES AC106 - Acceptance Criteria for Pre drilled Fasteners (Screw Anchors) in Masonry; 2018, with Editorial Revision (2020).
- T. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2017, with Editorial Revision (2020).
- U. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2023.
- V. ISO 6944-1 - Fire Containment -- Elements of Building Construction -- Part 1: Ventilation Ducts; 2024.
- W. NFPA 45 - Standard on Fire Protection for Laboratories Using Chemicals; 2024.
- X. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2027.
- Y. NFPA 91 - Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids; 2026.

- Z. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2027.
- AA. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- BB. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.
- CC. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.
- DD. SMACNA (Phenolic) - Phenolic Duct Construction Standards; 2015.
- EE. SMACNA (RIDC) - Rectangular Industrial Duct Construction Standards; 2024.
- FF. SMACNA (ROUND) - Round Industrial Duct Construction Standards; 2013.
- GG. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; 2024.
- HH. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.
- II. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.
- JJ. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- KK. UL 1978 - Grease Ducts; Current Edition, Including All Revisions.
- LL. UL 2221 - Tests of Fire Resistive Grease Duct Enclosure Assemblies; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for duct materials and duct liner.
- C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate per appropriate seal class, following SMACNA (LEAK).
- D. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of documented experience.
- B. Coordinate routing, orientation, and support locations of exposed ductwork with the Architect prior to fabrication

1.6 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

1.7 WARRANTY

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

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B. Acoustical Treatment: When indicated, provide sound-absorbing liners and sectional silencers for metal-based ducts in compliance with Section 23 3319.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- D. Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
 - a. Supply Air: 4 in-wc pressure class, galvanized steel.
 - b. Outside Air Intake: 3 in-wc pressure class, galvanized steel.
 - c. Return and Relief Air: 3 in-wc pressure class, galvanized steel.
 - d. General Exhaust Air: 4 in-wc pressure class, galvanized steel.
 - 2. Low Pressure Service: Up to 1 in-wc:
 - a. Seal: Class C, apply to seal off transverse joints.
 - b. Leakage:
 - 1) Rectangular: Class 12 or 12 cfm/100 sq ft.
 - 2) Round: Class 12 or 12 cfm/100 sq ft.
 - 3. Low Pressure Service: From 1 in-wc to 3 in-wc:
 - a. Seal: Class B, apply sealing of transverse joints and longitudinal seams.
 - b. Leakage:
 - 1) Rectangular: Class 4 or 4 cfm/100 sq ft.
 - 2) Round & Flat Oval: Class 2 or 2 cfm/100 sq ft.
 - 4. Medium and High Pressure Service: Above 3 in-wc:
 - a. Seal: Class A, apply sealing of transverse joints, longitudinal seams, and duct wall penetrations.
 - b. Leakage:
 - 1) Rectangular: Class 6 or 6 cfm/100 sq ft.
 - 2) Round: Class 3 or 3 cfm/100 sq ft.
- E. Duct Fabrication Requirements:
 - 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.

2. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
3. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
4. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
5. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
6. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
7. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
8. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.2 METAL DUCTS

A. Material Requirements:

1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G90/Z275 coating. Finish for surface exposed to view: Mill phosphatized.
2. Stainless Steel: ASTM A480/A480M, Type 304 or 316..

B. Metal Duct Coating Requirements:

1. PVC Coating for Steel Duct: 4 mils polyvinyl chloride plastic on interior..

C. Round Metal Ducts:

1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall.
2. Round Connection System: Interlocking duct connection system in accordance with SMACNA (DCS).

D. Connectors, Fittings, Sealants, and Miscellaneous:

1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
2. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - b. VOC Content: Not more than 250 g/L, excluding water.
 - c. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
 - d. For Use with Flexible Ducts: UL labeled.
3. Gasket Tape:
 - a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.
4. Hanger Rod: ASTM A36/A36M; steel; threaded both ends, threaded one end, or continuously threaded.

- a. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- b. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- c. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- 5. Hanger Fasteners: Attach hangers to structure using appropriate fasteners as follows:
 - a. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
 - b. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
 - c. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
 - d. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
 - e. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
 - f. Other Types: As required.
- 6. Trapeze and Riser Supports:
 - a. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - b. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 - c. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.
- 7. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.
- 8. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

2.3 FLEXIBLE DUCTS

- A. Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form spiral helix.
 - 1. Insulation: R6 insulation with polyethylene vapor barrier film.
 - 2. Pressure Rating: 10 in-wc positive and 1 in-wc negative.
 - 3. Maximum Velocity: 4000 fpm.
 - 4. Temperature Range: Minus 20 degrees F to 250 degrees F.
- B. Uninsulated Flexible Air Ducts:
 - 1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire.
 - 2. Pressure Rating: From 10 in-wc to 1 in-wc negative.
 - 3. Maximum Velocity: 4,000 fpm.
 - 4. Temperature Range: Minus 20 to 210 degrees F.

2.4 PAINT GRIP DUCTS

- A.
- B. Materials:
 - 1. Sheet Steel: Paint grip (chemically treated/phosphatized) galvanized steel sheet, ASTM A653/A653M, G60 (Z180) coating, mill-treated for paint adhesion, unless otherwise indicated.
 - 2. Gauges and Reinforcement: Per SMACNA HVAC Duct Construction Standards, based on duct dimension and pressure classification indicated on the Drawings.

3. Joint Sealant: Water-based, UL 181A-M or UL 181B-M listed duct sealant, compatible with the paint grip coating.
4. Fasteners: Galvanized or zinc-plated steel, sized per SMACNA standards.
5. Hangers and Supports: Galvanized steel per SMACNA standards. Where ductwork is exposed to view, provide trapeze or strap hangers as indicated on the Drawings, finished to match adjacent conditions.

C. Fabrication:

1. Fabricate rectangular ducts in accordance with SMACNA HVAC Duct Construction Standards for the pressure class and sealing class indicated.
2. Form duct seams, joints, and reinforcement to permit uniform application of field-applied paint without exposed raw or unfinished edges.
3. Locate longitudinal seams to minimize visibility in ductwork exposed to view, as directed by the Architect.
4. Provide turning vanes, splitter dampers, and volume dampers in paint grip material to match duct construction.
5. Protect the factory-applied paint grip finish during fabrication. Grind smooth and treat welds, abraded areas, or bare metal exposed during fabrication with a compatible primer so the entire duct surface is suitable for field painting.

D. Accessories:

1. Access Doors: Paint grip galvanized steel, insulated where required, sized and located per the Drawings and SMACNA standards.
2. Flexible Connections: Fabric type, fire-retardant, at fan and equipment connections.
3. Duct Liner/Insulation: As specified in Section 23 07 13, where indicated.

2.5 DUCTS FOR LABORATORY AND INDUSTRIAL-GRADE APPLICATIONS

A. Sectional Shape and Material Requirements:

1. Round and rectangular Metal Duct:
 - a. Pressure Class: Plus or minus 4 in-wc.
 - b. Minimum Duct Thickness: Duct Class 1, 2 and 5; 18 gauge, 0.048 inch.
 - c. Compliance: Provide ductwork, fittings, supports, hangers, and appurtenances:
 - 1) Round: SMACNA (ROUND) construction standard.
 - 2) Rectangular: SMACNA (RIDC) construction standard.

B. Laboratory Exhaust Applications:

1. General Lab Exhaust:
 - a. PVC coated galvanized steel ductwork. 4 in-wc. pressure class.
 - 1) Fabricate in accordance with ductwork manufacturer's instructions; test duct system to sustain positive and negative pressures in accordance with ASHRAE Std 126 and ASME AG-1.
 - b. Provide ductwork and appurtenances in accordance with NFPA 91 requirements except where NFPA 45 applications take precedence.
 - c. Coordinate duct, fittings, hangers, and accessories to comply with ANSI Z9.5.
 - d. Design, fabricate, and install liquidtight preventing exhaust leakage into the building.
2. Fume Hood Cabinet Exhaust:
 - a. Type 304 or 316 stainless steel. Duct connections shall be welded. 4 in-wc pressure class.

- 1) Fabricate in accordance with ductwork manufacturer's instructions; test duct system to sustain positive and negative pressures in accordance with ASHRAE Std 126 and ASME AG-1.
- b. Provide ductwork and appurtenances in accordance with NFPA 91 requirements except where NFPA 45 applications take precedence.
- c. Coordinate duct, fittings, hangers, and accessories to comply with ANSI Z9.5.
- d. Design, fabricate, and install liquidtight preventing exhaust leakage into the building.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install, support, and seal ducts in accordance with SMACNA (DCS). Use sealants compatible with the paint grip surface.
- C. Install products following the manufacturer's instructions.
- D. Comply with safety standards NFPA 90A and NFPA 90B.
- E. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
- F. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- G. Flexible Ducts: Connect to metal ducts with draw bands.
- H. PVC Coated Metal Ductwork: Tape with PVC tape.
- I. Protect the paint grip coating during installation. Touch up damaged, scratched, or bare areas with a compatible primer prior to field painting.
- J. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.
- K. Provide openings in ductwork as indicated to accommodate thermometers and controllers. Provide pilot tube openings as indicated for testing of systems, complete with metal can with spring device or screw to insure against air leakage. For openings, insulate ductwork and install insulation material inside a metal ring.
- L. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- M. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with a crimp in the direction of airflow.

- N. Use double nuts and lock washers on threaded rod supports.
- O. Connect terminal units to supply ducts.
- P. Connect diffusers or light troffer boots to low-pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.
- Q. At exterior wall louvers, seal duct to louver frame and install blank-out panels.
- R. Fire Partitions: Provide firestopping sealing. See Section 07 8400.
- S. Duct Accessories, Terminal Units, Inlets, and Outlets: Interconnect as indicated in Sections 23 3300, 23 3600, and 23 3700.
- T. Duct Insulation: Provide duct insulation. See Section 23 0713.
- U. Painting: Provide surface finish as indicated on drawings. See Sections 09 9113 and 09 9123.

3.2 CLEANING

- A. See Section 01 7419 - Construction Waste Management and Disposal for additional requirements.
- B. Clean thoroughly each duct system. See Section 23 0130.51.
- C. Paint grip duct:
 - 1. Remove grease, oil, dirt, markings, and fingerprints from duct surfaces prior to turnover for painting.
 - 2. Clean the interior of ductwork of debris, dust, and construction materials prior to system startup.

END OF SECTION 23 3100 23 3100

SECTION 23 3300 - AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Duct access doors.
- D. Fire dampers.
- E. Flexible duct connectors.
- F. Volume control dampers.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 23 3100 - HVAC Ducts and Casings.
- C. Section 23 3600 - Air Terminal Units: Pressure regulating damper assemblies.

1.3 REFERENCE STANDARDS

- A. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).
- B. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2027.
- C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- D. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. Product Data: Provide for shop-fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
- B. Manufacturer's Installation Instructions: Provide instructions for fire dampers.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.
- B. Multi-blade device with radius blades attached to pivoting frame and bracket, steel construction, with push-pull operator strap.

2.2 BACKDRAFT DAMPERS - METAL

- A. Gravity Backdraft Dampers, Size 18 by 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.
- B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 DUCT ACCESS DOORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick-fastening locking devices. For insulated ducts, install minimum 1-inch thick insulation with sheet metal cover.
 - 1. Less Than 12 inches Square: Secure with sash locks.
 - 2. Up to 18 inches Square: Provide two hinges and two sash locks.
 - 3. Up to 24 by 48 inches: Three hinges and two compression latches with outside and inside handles.
- C. Access doors with sheet metal screw fasteners are not acceptable.

2.4 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.5 FIRE DAMPERS

- A. Manufacturers:
 - 1. Louvers & Dampers, Inc, a brand of Mestek, Inc; _____: www.louvers-dampers.com/#sle.
 - 2. Nailor Industries, Inc; _____: www.nailor.com/#sle.
 - 3. NCA, a brand of Metal Industries Inc; _____: www.ncamfg.com/#sle.
 - 4. Pottorff; _____: www.pottorff.com/#sle.

5. Ruskin Company; _____: www.ruskin.com/#sle.
6. United Enertech; _____: www.unitedenertech.com/#sle.

- B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.
- C. Closing rating in ducts up to 4-inch wg static pressure class and minimum 2000 fpm velocity. Where needed, provide greater pressure class and velocity rated dampers as determined via air distribution system design.
- D. Horizontal Dampers: Galvanized steel, 0.034-inch frame, stainless steel closure spring, and lightweight, heat-retardant, non-asbestos fabric blanket.
- E. Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations. Configure with blades out of air stream except for 1-inch pressure-class ducts up to 12 inches in height.
- F. Heat Responsive Device: Resettable link and switch package, factory installed.
- G. Fusible Links: UL 33, separate at 165 degrees F with adjustable link straps for combination fire/balancing dampers.

2.6 FLEXIBLE DUCT CONNECTORS

- A. Manufacturers:
 1. Ductmate Industries, Inc, a DMI Company; _____: www.ductmate.com/#sle.
 2. Duro Dyne Inc..
 3. Flexmaster USA Inc.
 4. Ward Industries Inc.
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.
- C. Flexible Duct Connections: Fabric crimped into metal edging strip.
 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 26 oz/sq yd.
 - a. Net Fabric Width: Approximately 3-1/2 inch wide.
 2. Metal: 3 inches wide, 23 gauge, 0.028 inch thick galvanized steel or 0.032 inch thick aluminum. Provide metal compatible with connected ducts.
 3. Service temperature minus 40 to plus 200 deg F.
 4. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.

2.7 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Standard leakage rating, with linkage outside airstream.
- C. Stiffen damper blades for stability.
- D. Frames: Hat-shaped, 0.10-inch- thick, galvanized sheet steel or aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
- E. Suitable for horizontal or vertical applications.

- F. Single Blade Dampers:
 - 1. Blade: 0.05 inch thick extruded aluminum or 0.10 inch thick aluminum sheet, minimum.
- G. Multi-Blade Damper: Fabricate consisting of opposed blades with maximum blade sizes 8 by 72 inches. Assemble center- and edge-crimped blades in prime-coated or galvanized-channel frame with suitable hardware.
 - 1. Blade: 0.064 inch, minimum. Galvanized steel or aluminum blades based on application.
- H. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 23 3100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96 Provide minimum 8 by 8 inch size access door for hand and shoulder access, or as indicated on drawings. Provide minimum 4 by 4 inch size access door for balancing dampers only. Review locations prior to fabrication.
- D. Provide duct test holes where indicated and required for testing and balancing purposes.
- E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire-rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- F. Demonstrate re-setting of fire dampers to Owner's representative.
- G. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- H. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
 - 1. See Section 23 0548.
- I. For fans developing static pressures of 5.0 inches and over, cover flexible connections with leaded vinyl sheet, held in place with metal straps.
- J. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.

- K. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION 23 3300

SECTION 23 3423 - HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof exhausters.

1.2 RELATED REQUIREMENTS

- A. Section 22 1005 - Plumbing Piping.
- B. Section 22 1119 - Domestic Water Piping Specialties.
- C. Section 23 0513 - Common Motor Requirements for HVAC Equipment.
- D. Section 23 0548 - Vibration and Seismic Controls for HVAC.
- E. Section 23 0553 - Identification for HVAC Piping and Equipment
- F. Section 23 3100 - HVAC Ducts and Casings.
- G. Section 23 3300 - Air Duct Accessories: Backdraft dampers.
- H. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B. AMCA 99 - Standards Handbook; 2025.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2020.
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2025.
- E. AMCA 211 - Certified Ratings Program Product Rating Manual for Fan Air Performance; 2022, with Editorial Revision (2023).
- F. AMCA 300 - Reverberation Room Methods of Sound Testing of Fans; 2024.
- G. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.
- H. AMCA 311 - Certified Ratings Program Product Rating Manual for Fan Sound Performance; 2016.
- I. ANSI Z9.5 - Laboratory Ventilation; 2022.
- J. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2027.

- K. UL 705 - Power Ventilators; Current Edition, Including All Revisions.
- L. UL 762 - Outline of Investigation for Power Roof Ventilators for Restaurant Exhaust Appliances; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate fan roof curbs and service utilities installation according to fan size.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
 - 3. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.7 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. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 PRODUCTS

2.1 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: Comply with AMCA 204.
- B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300.
- D. Fabrication: Comply with AMCA 99.
- E. UL Compliance: UL 705, listed, labeled, designed, manufactured, and tested.

- F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- G. Motors: Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified.
 - 1. Motor size shall be selected as to not require motor to operate in service factor range above 1.0.
 - 2. Enclosure type: Totally enclosed, fan cooled, unless otherwise noted.
- H. Fan Energy Efficiency: Fans provided shall operate at an equal or greater fan energy efficiency than basis of design.

2.2 ROOF EXHAUSTERS

- A. Manufacturers:
 - 1. Greenheck
 - 2. Loren Cook
 - 3. Twin City Fan
 - 4. ACME
 - 5. Aerovent
 - 6. CaptiveAire
- B. Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.
- C. Roof Curb: Minimum 12 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips, factory installed nailer strip, and standard insulation or as scheduled on the drawings. Size as required to suit roof opening, roof pitch, and fan base.
- D. Disconnect Switch: Factory wired, nonfusible, in housing for thermal overload protected motor and solid state or ECM speed controller dial/BAS integration.
- E. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, or as scheduled on drawings. Gravity dampers shall be Factory set to close when fan stops.
- F. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm gets attained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.
- G. Performance Ratings: As indicated on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.
- C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.

- D. Hung Cabinet Fans:
 - 1. Install fans with resilient mountings and flexible electrical leads, see Section 23 0548.
 - 2. Install flexible connections between fan and ductwork; see Section 23 3300. Ensure metal bands of connectors are parallel with minimum 1 inch flex between ductwork and fan while running.
- E. Provide sheaves required for final air balance.
- F. Install backdraft dampers on inlet to roof and wall exhausters as allowed per AHJ.
- G. Provide backdraft dampers on outlet from cabinet and ceiling exhaust fan and as indicated.
- H. Install units with clearances for service and maintenance.
- I. Label units according to requirements specified in Section 23 0553 Identification for HVAC Piping and Equipment.

3.2 CONNECTIONS

- A. Coordinate duct installation and specialty arrangements with schematics on Drawings and with requirements specified in duct systems.
- B. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 23 3300 "Air Duct Accessories."
- C. Install ducts adjacent to power ventilators to allow service and maintenance.
- D. Ground equipment according to Section 26 0526 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Section 26 0519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
 - 5. Adjust belt tension.
 - 6. Adjust damper linkages for proper damper operation.

7. Verify lubrication for bearings and other moving parts.
 8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
 10. Shut unit down and reconnect automatic temperature-control operators.
 11. Remove and replace malfunctioning units and retest as specified above.
- C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Prepare test and inspection reports.

3.4 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Comply with requirements in Section 23 0593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
- D. Replace fan and motor pulleys as required to achieve design airflow.
- E. Lubricate bearings.

END OF SECTION 23 3423 23 3423

SECTION 23 3500 - FUME EXTRACTION ARMS

PART 1 - GENERAL

1.1 PRODUCT SUMMARY

- A. Section includes wall/ceiling/floor/bench mount fume extraction arms designed for use where protection from corrosive smoke, particulate and fumes, or spark protection from static electricity is not required.
 - 1. Bench mount fume extraction arms
 - a. Extraction Arm
 - b. Mounting Brackets
 - c. Hoods and nozzles

1.2 SYSTEM DESCRIPTION

- A. Systems Included
 - 1. Provide fume extraction arms offering removal of numerous kinds of airborne pollution offering strength and durability combined with light and easy handling.
 - a. The fume extraction arms and accessories must be suitable for applications where standard, non corrosive and non static control of fumes, particulate and smoke is acceptable and a small and flexible and easy to use arm is required.

1.3 QUALITY ASSURANCE

- A. Installer qualifications: The installer shall be a licensed contractor with proven experience in the fabrication and installation of ventilating systems. The contractor shall be acceptable to the manufacturer and shall have received factory training if required.
- B. Product Data: Submit product specifications, technical data, standard detail drawings and installation instructions.
- C. Shop Drawings: Submit shop drawings for the fabrication and installation of xx. Indicate other project specific data not included in the fabrication and installation drawings and required for project to include, but not limited to:
 - a. Layout and arrangement to fit to the job site requirements.
 - b. Product power and control drawings to be submitted as directed.

1.4 RELATED WORK

- A. Duct work associated with the venting of the system(s).
- B. Exhaust Fans associated with the system requirements.
- C. Electrical power and control and final connections.

PART 2 - PRODUCTS

2.1 BASIS OF DESIGN

- A. Mini extraction arm for table mounting suitable for The fume extraction arms and accessories must be suitable for applications where standard, non corrosive and non static control of fumes, particulate and smoke is acceptable and a small and flexible and easy to use arm is required.
- B. Manufacturer:
 - 1. Ventaire
 - 2. Monoxivent
 - 3. Nederman
- C. Fume Arms
 - 1. Arm sections are to be thin walled, non-corrosion resistant, anodized aluminum tubes. Joints are to be white plastic joints. The arms are to be available in 2" and 3" inch diameters. 3" diameter arms shall be provided with 2" to 3" duct transition.
 - 2. The mounting swivel assembly shall be white plastic and capable of 360 degree rotation. The mounting swivel shall connect to a ceiling, wall or bench mounting bracket.
 - 3. Jointed elbows shall be white plastic. Knurled adjusting knobs supported by ball bearings are to be utilized at each friction joint. Each friction elbow section shall be sealed using an "O" ring. Metal components exposed to the air stream shall be steel.
 - 4. The two outermost joints of the arm shall rotate and swivel through 360 degrees. This feature is to provide unique directional flexibility and makes it possible to position the hood exactly where required. The external locking rings and locking knobs shall be polypropylene.
- D. Integral Damper
 - 1. The fume arms shall incorporate a factory mounted integral damper. The damper blade shall be white plastic and the damper adjustment handle shall be anodized aluminum.
- E. Integral Hood
 - 1. Provide with clear dome plastic hood.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify with owner location and mounting height.
- B. Install hose reel system, with direct mount blower, plumb and level.
- C. Support unit(s) using manufacturer's mounting brackets in accordance with written instructions.
- D. Install units with clearances for service and maintenance.

3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in other Division 15 Sections and must comply with minimum SMACNA pressure standards. Drawings indicate general arrangement of ducts and duct accessories.

- B. Install ducts adjacent to exhaust fans and hose reels to allow service and maintenance.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding."
- D. Connect wiring according to Division 26 Section "Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. Verify that unit is secure on mountings and supporting devices and that the connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. Verify lubrication for bearings and other moving parts.
 - 5. Remove and replace malfunctioning units and re-test as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Refer to Division 23 Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing procedures.
- B. Replace fan and motor pulleys as required to achieve design airflow.
- C. Lubricate bearings.

END OF SECTION 23 3500

SECTION 23 3700 - AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Diffusers:
 - 1. Perforated ceiling diffusers.
- B. Rectangular ceiling diffusers.
- C. Slot ceiling diffusers.
- D. Registers/grilles:
 - 1. Ceiling-mounted, egg crate exhaust and return register/grilles.
 - 2. Ceiling-mounted, register/grilles.
- E. Duct-mounted supply and return registers/louvers.
- F. Louvers:
- G. Roof hoods.
- H. Gravity ventilators.

1.2 RELATED REQUIREMENTS

- A. Section 09 9123 - Interior Painting: Painting of ducts visible behind outlets and inlets.

1.3 REFERENCE STANDARDS

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2023.
- B. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2021, with Editorial Revision (2022).
- C. AMCA 550 - Test Method for High Velocity Wind Driven Rain Resistant Louvers; 2022.
- D. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets; 2023.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
- G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.4 SUBMITTALS

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

- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.5 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Test and rate louver performance in accordance with AMCA 500-L.

PART 2 PRODUCTS

2.1 RECTANGULAR CEILING DIFFUSERS

- A. Manufacturers:
 - 1. Titus
 - 2. Price
 - 3. Nailor
 - 4. Krueger
 - 5. Tuttle & Bailey
 - 6. Metalaire, Inc.
- B. Type: Provide rectangular and square formed adjustable, backpan stamped, core removable, and multi-louvered ceiling diffusers constructed to maintain 360 degree discharge air pattern with sectorizing baffles where indicated.
- C. Connections: Round.
- D. Frame: Provide surface mount, snap-in, inverted T-bar, and spline type. In plaster ceilings, provide plaster frame and ceiling frame.
- E. Fabrication: Steel with baked enamel finish.
- F. Color: As indicated.

2.2 PERFORATED FACE CEILING DIFFUSERS

- A. Manufacturers:
 - 1. Titus
 - 2. Price
 - 3. Nailor
 - 4. Krueger
 - 5. Tuttle & Bailey
 - 6. Metalaire, Inc.
- B. Type: Perforated face.
- C. Fabrication: Steel with steel frame and baked enamel finish.
- D. Color: As indicated.

2.3 CEILING SLOT DIFFUSERS

- A. Manufacturers:
 - 1. Titus
 - 2. Price
 - 3. Nailor
 - 4. Krueger
 - 5. Tuttle & Bailey
 - 6. Metalaire, Inc.
- B. Type: Continuous slot, with adjustable vanes for left, right, or vertical discharge.
- C. Fabrication: Aluminum extrusions with factory baked enamel finish.
- D. Color: As indicated.
- E. Frame: 1-1/4 inch margin with concealed mounting and gasket, mitered end border.
- F. Plenum: Integral, galvanized steel, insulated.

2.4 DUCT-MOUNTED SUPPLY AND RETURN REGISTERS/LOUVERS

- A. Manufacturers:
 - 1. Titus
 - 2. Price
 - 3. Nailor
 - 4. Krueger
 - 5. Tuttle & Bailey
 - 6. Metalaire, Inc.
- B. Type: Duct-mounted, rectangular register with adjustable pivot-ended blades, end caps, and dual cover flanges to lay flush on duct surface regardless of diameter. Performance to match manufacturer's catalog data.
- C. Color: As indicated on drawings.

2.5 CEILING & WALL REGISTERS/GRILLES

- A. Manufacturers:
 - 1. Titus
 - 2. Price
 - 3. Nailor
 - 4. Krueger
 - 5. Tuttle & Bailey
 - 6. Metalaire, Inc.
- B. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, two-way deflection.
- C. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
- D. Construction: Made of aluminum extrusions with factory enamel finish.

- E. Color: As indicated.

2.6 CEILING EGG CRATE EXHAUST AND RETURN GRILLES

- A. Manufacturers:
 - 1. Titus
 - 2. Price
 - 3. Nailor
 - 4. Krueger
 - 5. Tuttle & Bailey
 - 6. Metalaire, Inc.
- B. Type: Egg crate style face consisting of 1/2 by 1/2 by 1/2 inch grid core.
- C. Fabrication: Grid core consists of aluminum with baked enamel finish.
- D. Color: As indicated.
- E. Frame: Channel lay-in frame for suspended grid ceilings.

2.7 LOUVERS

- A. Manufacturers:
 - 1. Greenheck
 - 2. Ruskin
 - 3. Pottorff
 - 4. Nailor
 - 5. NCA
 - 6. Arrow United Industries
- B. Type: 4 inch deep frame with blades on 45 degree slope with center baffle and return bend, heavy channel frame, 1/2 inch square mesh screen over intake or exhaust end.
- C. Fabrication: Aluminum thick galvanized steel welded assembly, with factory baked enamel finish.
- D. Color: To be selected by Architect from manufacturer's full range.

2.8 ROOF HOODS

- A. Manufacturers:
 - 1. Greenheck
 - 2. Ruskin
 - 3. Loren Cook Co.
 - 4. Arrow United Industries
 - 5. ACME
- B. Fabricate air inlet or exhaust hoods in accordance with SMACNA (DCS).
- C. Fabricate of galvanized steel, minimum 16 gauge, 0.0598 inch base and 20 gauge, 0.0359 inch hood, or aluminum, minimum 16 gauge, 0.0598 inch base and 18 gauge, 0.0598 inch hood;

suitably reinforced; with removable hood; birdscreen with 1/2 inch square mesh for exhaust and 3/4 inch for intake, and factory prime coat finish.

- D. Fabricate louver penthouses with mitered corners and reinforce with structural angles.
- E. Mount unit on minimum 18 inch high curb base with insulation between duct and curb unless otherwise noted on the drawings and schedules.

2.9 GRAVITY VENTILATORS

A. Hood Intake and Relief Gravity Ventilator:

- 1. Manufacturers:
 - a. Greenheck
 - b. Ruskin
 - c. Loren Cook Co.
 - d. Arrow United Industries
 - e. ACME
- 2. General:
 - a. Low silhouette for intake applications with natural gravity or negative pressure system(s).
 - b. Performance ratings and factory testing in accordance with AMCA 511 and AMCA 550.
- 3. Hood and Base:
 - a. Material: Aluminum.
 - b. Hood Construction: Precision formed, arched panels with interlocking seams.
 - c. Vertical End Panels: Fully locked into hood end panels.
 - d. Curb Cap: Pre-punched mounting holes for installation.
- 4. Birdscreen:
 - a. Fabricate in accordance with ASTM B221 (ASTM B221M).
 - b. Construction: 1/2 inch Galvanized mesh.
- 5. Hood Support: Galvanized steel construction and fastened so hood can be removed completely from base or hinged open.
- 6. Options/Accessories:
 - a. Roof Curbs:
 - 1) Flat Roofs:
 - a) Welded, straight side curb with flashing flange and wood nailer.
 - 2) Pitched Roofs: Welded, straight side curb with flashing flange and wood nailer.
 - 3) Insulation Thickness: 1-1/2 inches.
 - b. Curb Seal: Rubber seal between fan and roof curb.
 - c. Factory Finish: Baked Enamel, color selection by Architect. Curb to match hood color.

B. Spun Aluminum Intake and Relief Gravity Ventilator:

- 1. General:
 - a. Provide low silhouette configuration for intake applications with natural gravity or negative pressure system.
 - b. Performance ratings and factory testing in accordance with AMCA 511 and AMCA 550.

2. Hood:
 - a. Material: Aluminum.
3. Birdscreen:
 - a. Fabricate in accordance with ASTM B221 (ASTM B221M).
 - b. Construction: 1/2 inch galvanized mesh.
4. Housing:
 - a. Curb Cap:
 - 1) Construction: Aluminum.
5. Options/Accessories:
 - a. Roof Curbs:
 - 1) Flat Roofs:
 - a) Welded, straight side curb with flashing flange and wood nailer.
 - 2) Pitched Roofs: Welded, straight side curb with flashing flange and wood nailer.
 - 3) Insulation Thickness: 1-1/2 inches.
 - b. Curb Seal: Rubber seal between fan and roof curb.
 - c. Factory Finish: Baked enamel, color selection by Architect.. Curb color to match hood color.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black, see Section 09 9123.

3.2 CLOSEOUT ACTIVITIES

- A. Demonstrate operational system to Owner's representative.
- B. Instruct Owner's representative to maintain system and use occupant controls or interfaces, as required.

3.3 PROTECTION

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

END OF SECTION 23 3700

SECTION 23 8216 - AIR COILS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water coils.

1.2 RELATED REQUIREMENTS

- A. Section 23 0719 - HVAC Piping Insulation.
- B. Section 23 2114 - Hydronic Specialties.
- C. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

- A. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils; 2001, with Addenda (2011).
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions.
- C. Certificates: Certify that coil capacities, pressure drops, and selection procedures meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect coil fins from crushing and bending by leaving in shipping cases until installation, and by storing indoors.
- B. Protect coils from entry of dirt and debris with pipe caps or plugs.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Trane
- B. Daikin
- C. York
- D. Carrier Corporation
- E. Greenheck

2.2 WATER COILS

- A. Tubes: 5/8 inch OD seamless copper arranged in parallel or staggered pattern, expanded into fins, brazed joints.
- B. Fins: Aluminum minimum 0.006 inch (0.152 mm) thick.
- C. Casing: Die formed channel frame of 16 gauge, 0.0598 inch galvanized steel with mounting holes on 3 inch centers. Provide tube supports for coils longer than 36 inches.
- D. Headers: Seamless copper tube with silver brazed joints.
- E. Testing: Air test under water to 300 psi for working pressure of 200 psi and 325 degrees F.
- F. Configuration: Serpentine type with return bends on smaller sizes and return headers on larger sizes.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's written instructions.
- B. Install in ducts and casings in accordance with SMACNA (DCS).
 - 1. Support coil sections independent of piping on steel channel or double angle frames and secure to casings.
 - 2. Provide airtight seal between coil and duct or casing.
- C. Protect coils to prevent damage to fins and flanges. Comb out bent fins.
- D. Install coils level. Install cleanable tube coils with 1:50 pitch.
- E. Make connections to coils with unions and flanges.
- F. Hydronic Coils:
 - 1. Hydronic Coils: Connect water supply to leaving air side of coil (counterflow arrangement).
 - 2. Provide manual air vents at high points complete with stop valve.
 - 3. Ensure water coils are drainable and provide drain connection at low points.

G. Cooling Coils:

1. Provide drain pan and drain connection; fabricate from 20 gauge, 0.0359 inch galvanized steel, extend 3 inches from face of entering air side, 6 inches from face of leaving air side, and 4 inches from face of eliminators. Pipe drain pans individually to floor drain with water seal trap.
 - a. Drain pan minimum depth: 2 inches (50 mm)
 - b. Provide armaflex insulation under drain pan to prevent condensate from dripping to space below
 - c. Fabricate pan with one percent slope in at least two planes to collect condensate from cooling coils (coil headers and return bends) to direct water toward drain connection. drain shall be located at lowest point of pan and sized to prevent overflow, minimum connection size NPS 1 (DN 25) terminated with threaded nipple.
 - d. Units with stacked coils shall have an intermediate drain pan to collect condensate from top coil

H. Electric Duct Coils: Wire in accordance with NFPA 70. Refer to Section 26 0583.

END OF SECTION 23 8216

SECTION 26 0000 - ELECTRICAL GENERAL REQUIREMENTS

PART 1 GENERAL

1.1 APPLICABILITY

- A. This section applies to and forms a part of each of the sections of Divisions 26, 27, and 28.
- B. General and Supplementary Conditions, and Division 1 – General Requirements shall apply to all work specified in this section.

1.2 SCOPE OF WORK

- A. The work under this section of the specifications consists of providing all labor, supervision, equipment, and materials necessary for and incidental to the installation of the complete electrical systems required by these specifications and/or drawings of the contract.

1.3 DRAWINGS

- A. The drawings indicate the extent and general layout of the electrical systems and are intended to be as accurate as planning can determine at the scale shown for estimating purposes only. Field verification of dimensions, locations, and construction details is required. Review appropriate drawings, make field measurements and adjust work to suit the conditions encountered. Electrical drawings are only diagrammatic but shall be followed as closely as actual construction of other trade will permit.
- B. Do not scale off the electrical drawings.
- C. Notify the Architect/Engineer of any discrepancies in or omissions from the drawings and documents. Interpretations will be made only by written Addenda. If discrepancies are not reported, the contractor shall bid the greater quantity or better quality, and appropriate adjustment will be made after contract award.
- D. Discrepancies discovered during construction shall immediately be called to the attention of the Architect/Engineer for clarification.

1.4 PERMITS AND LICENSES

- A. Obtain and pay for all licenses and permits, and pay all fees and charges for the connection to outside services as required by the inspecting authorities having jurisdiction.

1.5 CODES AND ORDINANCES

- A. The entire installation shall be made in accordance with all ordinances, laws, regulations, and codes applicable to the work involved. If, in any instance, the plans and specifications conflict with such laws, the law shall take preference. This does not relieve the contractor from complying with any requirements of the drawings and specifications that may be in excess of the rules and not contrary to the same.

1.6 PROGRESS OF WORK

- A. Organize the work so that progress of electrical work will conform to the progress of other trades. Complete the entire installation as soon as building conditions permit.

1.7 COOPERATION WITH OTHER TRADES

- A. Cooperate with other trades and organize work so as to avoid conflict in space and time sequence. If interference develops, the matter shall be brought to the attention of the Architect/Engineer for decision.
- B. Prior to rough-in, verify voltage and current characteristics and control connections of electrical equipment furnished by others and wired under this division.

1.8 INSPECTION OF SITE

- A. Before submitting a proposal on the work contemplated in these specifications and accompanying drawings, each bidder shall examine the site and familiarize himself with the existing conditions and limitations. No extras will be allowed because of the contractor's misunderstanding as to the amount of work involved or his lack of knowledge of existing site conditions.

1.9 TESTS

- A. Test all equipment installed under these specifications and demonstrate its proper operation to the Architect/Engineer and Owner's representatives.
- B. Do not test or operate equipment for any purpose until it has been fully installed and serviced in accordance with the manufacturer's instructions.
- C. The entire installation shall be tested free from open and short circuits and improper grounds.

1.10 OPERATING INSTRUCTIONS

- A. At the completion of the project, the contractor shall furnish competent instruction to the Owner or his designated representatives, in operation and routine maintenance of the electrical equipment and systems.

1.11 RECORD DRAWING

- A. The contractor shall maintain one set of drawings at the job site to be used as a master copy. All changes and deviations shall be clearly marked and noted by colored pencil. These drawings shall be turned over to the Architect upon project completion.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 26 0000

SECTION 26 0100 - BASIC MATERIALS AND METHODS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 MATERIAL AND WORKMANSHIP

- A. All material shall be new, of the quality specified, and shall conform to NFPA, NEMA, UL and ANSI standards in every case where such a standard had been established for the particular type of material.
- B. Equipment shall be furnished with an U.L. label. Materials shall be standard products of manufacturer's regularly shall be standard products of manufacturer's regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design.
- C. Installation of materials shall be coordinated with other trades and installed at such time and manner as to not delay or interfere with the work of other trades.
- D. All workmanship shall be neat, first class and complete in both effectiveness and appearance and shall be executed by a person licensed and skilled in the trade.
- E. This contractor shall be held solely responsible for proper size and location of hangers, slots, chases, openings, etc., required for proper installation of his work and shall arrange with the proper contractors for the building in of inserts and leaving chases or openings.

1.3 STANDARDIZATION OF PRODUCT MANUFACTURER

- A. Except as noted, all magnetic starters, manual starters and motor control centers shall be manufactured by the same company, all finishes shall be the same color, and all equipment shall fit the space designated. Equipment manufactured by G.E., Square D, Westinghouse or Allen Bradley will be acceptable providing they comply with the specific condition of the specifications and accompanying drawings.
- B. Wiring devices, lighting fixtures, and other items covered under single specifications shall be of the same manufacturer and style whenever practical or where failure to do so is visibly noticeable.

1.4 MATERIAL HANDLING, STORAGE AND PROTECTION

- A. This contractor shall make provisions for delivery and safe storage of materials and arrangement for introduction into building of equipment too large to pass through finished or existing openings.
- B. During construction, it shall be the responsibility of this contractor to protect the surface of equipment and material furnished.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 CLEANING AND PAINTING

- A. Clear away all debris, surplus material, etc., resulting from work operations, leaving the job and the equipment furnished under this contract in a clean condition.
- B. Equipment furnished with finished paint coat shall be examined upon job completion for scratches and surface damage. Damaged surfaces shall be touched up to match factory finish.
- C. Light fixtures shall be dusted and cleaned prior to final acceptance.

3.2 CONCRETE EQUIPMENT

- A. Switchboards and emergency generator shall be mounted on 4" concrete pads furnished as noted on drawings. Size pads such that pad extend 2" beyond the perimeter of the equipment installed.
- B. Exterior light fixtures shall be on or in concrete bases provided by the electrical contractor and as detailed on drawings.
- C. Concrete shall conform to Division 03 of this specification.

3.3 CUTTING AND REPAIRING

- A. Cutting, fitting, and repairing which may be required for this work shall be done by craftsmen skilled in their respective trades. When cutting is required it shall be done in such a manner as to not weaken walls, partition, or floors. Concrete and masonry shall be cut with a diamond core drill or concrete saw. When patching is required, it shall be done and finished to match existing. All existing walls shall be cut and patched to install new boxes and conduit for the new construction work.

3.4 PENETRATIONS

- A. Sleeves shall be used to accommodate conduits, cables or pipes passing through concrete floors, walls and partitions. Sleeves shall be black iron pipe or galvanized sheet metal set in place and secured in position. Sleeves located above grade shall be caulked with an approved caulking compound to make water tight, fireproof, etc., as required by the particular application. Sleeves located below grade or through on- grade slabs shall be black iron pipe and shall be made watertight with oakum and / or lead wool and sealed with asphalt. For fireproofing, use item equal to 3M product 2000. One hour walls require HWB1003, ULCBJ 1000 and 5000.
- B. Conduit passing through poured concrete walls or floors may be imbedded directly into the concrete, however when subject to sheer forces, i.e. below grade applications, the conduit must be rigid steel.
- C. Cables and conductors, not in raceway, shall be placed in sleeves when passing through fire and smoke partitions.

- D. Sleeves penetrating floors shall extend a minimum of 4" above finished floor.
- E. Where acceptable to the Architect/ Engineer and other trades involved, conduit may be placed prior to concrete pour thereby eliminating the use of sleeves. The contractor shall, however, remain responsible to insure and make such installation watertight.
- F. Conduit or sleeves going through the roof shall be installed in pitch pockets complete with flashing as may be required by the type of building construction. Where feeding equipment located on roof, the electrical conduit may be run in the same pitch pocket as used to install piping, etc. to the equipment. It shall be the responsibility of the electrical contractor to coordinate sizes of curbs and pitch pockets so as to allow installation of conduit. If conduit cannot be installed in common opening with piping, etc. the electrical contractor shall provide a separate pitch pocket for his wiring.
- G. Where conduits, sleeves, wireways, and other electrical raceways pass through fire partitions, walls, or floors, install a fire-stop that provides an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight, completely fill clearances between raceway and openings as required maintaining the rating of the assembly penetrated.
- H. Where conduits, sleeves, wireways, and other electrical raceways pass through partitions, walls, floors or insulation separating spaces subject to temperature differences, effective means shall be taken to prevent air leaks, and condensation problems.
- I. Flexible or liquid tight flexible conduit may not be used through walls, floors, roof, etc. that are moisture, temperature, fire or smoke barriers. Conduits through these types of items must be either rigid steel or EMT.

3.5 MATERIAL INSTALLATION

- A. In general, all wiring and electrical items shall be concealed, with visual portions set true and plumb with building lines. Items shall be aligned in an orderly fashion consistent with the patterns and design of the background material.
- B. Where items are to be surface mounted, such items shall be grouped together. Provide a 3/4" plywood backing, painted two coats grey paint.

3.6 TRENCHES, EXCAVATING, AND BACKFILLING

- A. The contractor shall do trenching and excavating required installing equipment, underground cable and conduit to the depth shown or required for proper operation. Excavation below the required level shall be backfilled with earth and thoroughly tamped. The contractor shall do all shoring and bracing necessary to perform his work and as required for safety. Contractor shall remove by pumping or other means any water which accumulates in the excavation. Temporary bridges shall be built by the contractor where required to maintain traffic.
- B. In any excavation across hard surfaced streets, drives, or walks, contractor shall cut and replace the surface material. Replacement material shall be identical to material removed unless shown otherwise.
- C. If any excavation is across gravel bed or any stabilized yard, contractor shall repair damaged surface. Replacement material shall be identical to existing unless otherwise approved by the Engineer.

- D. The contractor shall backfill all excavations made for his work. Utilities services shall be observed by the Engineer or proper inspection authority before backfilling. Backfilling shall be done by placing earth evenly and carefully around conduit in 6" maximum layers. Backfill material shall be free from rock and debris.
- E. Each layer shall be carefully, mechanically compacted until at least one foot of cover exists over the pipe or equipment. The remainder of the back fill shall be placed and compacted in one-foot maximum layers. Compaction shall be 90% of the maximum standard Proctor density in area that are to be sodded or seeded Proctor density in areas that are to be sodded or seeded and shall be 95% of maximum modified Proctor density under walks, drives or any structure.
- F. The contractor shall be responsible for and shall repair without charge all damage due to settlement of the earth, including but not limited to laws, drives, streets or parking lots, over the damaged area.
- G. The contractor shall be responsible for cleaning up areas adjacent to the excavation where the earth has been temporarily stored, sweeping or washing pavement, repairing the gravel surface, or reseeding the lawns as required to bring the entire excavated area as close to the original conditions as possible.
- H. All excavated materials not required for fill or backfill shall be disposed or removed from the site by this contractor.

3.7 EQUIPMENT AND MOTOR CONNECTION

- A. Prior to rough-in, the electrical connector shall consult applicable shop drawing to determine connections required. If required connections differ from connections shown on drawings, consult engineer for resolution.
- B. Control devices, (unless an integral part of the equipment to be wired) furnished under other divisions of this specification, shall be turned over to this contractor for installation. Consult with other contractors, as to the exact location of their equipment needing electrical connections and install and connect control equipment. Provide boxes, mounting brackets, painted plywood backing, etc. as required to mount these devices.
- C. Where automatic controls are involved, wire equipment in the system to run continuously. This shall include required interlocks and primary equipment wiring required for normal operation such as solenoids, gas valves, etc.
- D. All conduit to motors shall be run exposed, except in finished areas, and shall terminate in liquid tight flexible conduit fastened directly to motor boxes. Where motors are located in equipment enclosures or an integral part of an equipment package, liquid tight flexible conduit shall be used to isolate equipment enclosure from the building electrical system and to isolate the motor(s) from the equipment enclosures.
- E. Provide necessary wiring of control and safety devices for overhead doors as required by manufacturer for complete installation.
- F. Comply with elevator requirements when wiring elevator motor.

END OF SECTION 26 0100

SECTION 26 0200 - DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. This section includes demolition and remodeling work required to facilitate renovation of existing areas as shown on drawings and herein specified.
- B. Demolition work as shown on drawings is intended only as a guide. It shall be the responsibility of this Contractor to visit and familiarize himself with the site prior to bidding and thereby determine the amount of demolition required. No extra compensation will be allowed because of the Contractor's misunderstanding as to the amount of work involved or his lack of knowledge of any existing conditions.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 DEMOLITION

- A. Where items are removed, the Contractor shall also remove associated wire and conduit.
- B. Except for rough-in material, i.e., wire, conduit, boxes and items indicated for re-use, existing equipment which is removed shall remain the property of the Owner and shall be stored or disposed of by the Contractor as directed.

3.2 REMODELING

- A. Relocate existing conduits, wires, equipment, devices, fixtures or other equipment as required to adapt existing electrical systems to the new electrical systems.
- B. Existing rough-in may be reused if in good condition or as called for on drawings. Conductors, fuses and lamps shall be new.
- C. The Contractor shall provide appropriate face plates to cover unused boxes in existing walls. Boxes made inaccessible by new construction shall be removed and necessary conduit extensions and wiring shall be provided as required by the removal of said box.
- D. The Contractor shall reconnect circuits unintentionally interrupted by the replacement, removal or relocation of electrical equipment, walls, ceiling, floors, etc.
- E. Items indicated as being reused shall be cleaned, stored & installed. Make any repairs indicated.

3.3 CONTINUITY OF ELECTRIC SERVICE

- A. The existing building will be in use during this construction, and this contractor shall schedule and carry out his work in such a manner as to cause the Owner a minimum of inconvenience due to service interruptions. Service interruptions shall be confined to the smallest area possible at any one time and all interruptions shall require prior approval by the Owner. After service has been restored following an interruption, the electrical contractor shall inspect areas affected by the interruption and be responsible that automatically controlled electrically operated equipment is returned to the same operating condition which existed prior to the interruption.
- B. Prior to any power outage lasting longer than 60 minutes, the electrical contractor shall disconnect batteries from all existing battery-operated lights. Upon restoration of power, reconnect batteries.

END OF SECTION 26 0200

SECTION 26 0400 - ELECTRIC SERVICE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of materials and labor required to provide the new electrical service to the new & remodeled building.
- B. Services to the buildings shall be as follows:
 - 1. Existing Service is 277/480 volt, 3 phase 4 wire.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 26 0400

SECTION 26 0519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Single conductor building wire.
- B. Underground feeder and branch-circuit cable.
- C. Service entrance cable.
- D. Metal-clad cable.
- E. Wiring connectors.
- F. Electrical tape.
- G. Wire pulling lubricant.
- H. Cable ties.
- I. Firestop sleeves.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2024).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2024.

- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
 - G. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable; 2018.
 - H. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF); 2024.
 - I. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
 - J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
 - K. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
 - L. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
 - M. UL 267 - Outline of Investigation for Wire-Pulling Compounds; Current Edition, Including All Revisions.
 - N. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
 - O. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
 - P. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
 - Q. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables; Current Edition, Including All Revisions.
 - R. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
 - S. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.
- 1.4 SUBMITTALS
- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
 - B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- 1.5 QUALITY ASSURANCE
- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.
- H. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
 - 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
- I. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.

- b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
- c. 240/120 V High-Leg Delta, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B (High-Leg): Orange.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
- d. 240/120 V, 1 Phase, 3 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Neutral/Grounded: White.
- e. Equipment Ground, All Systems: Green.

2.3 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. General Cable Technologies Corporation; _____: www.generalcable.com/#sle.
 - d. Service Wire Co: www.servicewire.com/#sle.
 - e. Southwire Company: www.southwire.com/#sle.
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

2.4 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

- A. Manufacturers:
 - 1. Cerro Wire LLC: www.cerrowire.com/#sle.
 - 2. Encore Wire Corporation: www.encorewire.com/#sle.
 - 3. Service Wire Co: www.servicewire.com/#sle.
 - 4. Southwire Company: www.southwire.com/#sle.
- B. Description: NFPA 70, Type UF multiple-conductor cable listed and labeled as complying with UL 493, Type UF-B.

- C. Provide equipment grounding conductor unless otherwise indicated.
- D. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- E. Insulation Voltage Rating: 600 V.

2.5 SERVICE ENTRANCE CABLE

- A. Manufacturers:
 - 1. Copper Service Entrance Cable:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. Service Wire Co: www.servicewire.com/#sle.
 - d. Southwire Company: www.southwire.com/#sle.
- B. Conductor Stranding: Stranded.
- C. Insulation Voltage Rating: 600 V.

2.6 METAL-CLAD CABLE

- A. Manufacturers:
 - 1. AFC Cable Systems Inc: www.afcweb.com/#sle.
 - 2. Encore Wire Corporation: www.encorewire.com/#sle.
 - 3. Service Wire Co: www.servicewire.com/#sle.
 - 4. Southwire Company: www.southwire.com/#sle.
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Grounding: Full-size integral equipment grounding conductor.
- G. Armor: Steel, interlocked tape.

2.7 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Wiring Connectors for Splices and Taps:

1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- C. Wiring Connectors for Terminations:
- D. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. NSI Industries LLC: www.nsiindustries.com/#sle.
- E. Mechanical Connectors: Provide bolted type or set-screw type.
1. Manufacturers:
 - a. Burndy LLC; _____: www.burndy.com/#sle.
 - b. nVent ILSCO: www.ilsco.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
- F. Compression Connectors: Provide circumferential type or hex type crimp configuration.
1. Manufacturers:
 - a. Burndy LLC; _____: www.burndy.com/#sle.
 - b. nVent ILSCO: www.ilsco.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.

2.8 ACCESSORIES

- A. Electrical Tape:
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Plymouth Rubber Europa: www.plymouthrubber.com/#sle.
 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
- B. Wire Pulling Lubricant:
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. American Polywater Corporation: www.polywater.com/#sle.
 - c. Ideal Industries, Inc: www.idealindustries.com/#sle.
 2. Listed and labeled as complying with UL 267.
 3. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 4. Suitable for use at installation temperature.
 5. Products:
 - a. American Polywater Corporation; Polywater J Cable Pulling Lubricant: www.polywater.com/#sle.

- b. American Polywater Corporation; Polywater LZ Cable Pulling Lubricant: www.polywater.com/#sle.
- C. Cable Ties: Material and tensile strength rating suitable for application.
 - 1. Manufacturers:
 - a. Burndy LLC; _____: www.burndy.com/#sle.
- D. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for cables and roofing system to be installed; designed to accommodate existing penetrations where applicable.
 - 1. Products:
 - a. Menzies Metal Products; Electrical Roof Stack and Cap: www.menzies-metal.com/#sle.
 - b. Menzies Metal Products; Electrical Retro Box: www.menzies-metal.com/#sle.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
- E. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.
 - 1. Products:
 - a. HoldRite, a brand of Reliance Worldwide Corporation; HydroFlame Pro Series/HydroFlame Custom Built: www.holdrite.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.

3. Arrange circuiting to minimize splices.
 4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install underground feeder and branch-circuit cable (Type UF-B) in accordance with NECA 121.
- E. Install metal-clad cable (Type MC) in accordance with NECA 120.
- F. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 2. Pull all conductors and cables together into raceway at same time.
 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- G. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- H. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- I. Terminate cables using suitable fittings.
1. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- J. Install conductors with a minimum of 12 inches of slack at each outlet.
- K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- M. Make wiring connections using specified wiring connectors.

1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 3. Do not remove conductor strands to facilitate insertion into connector.
 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- O. Insulate ends of spare conductors using vinyl insulating electrical tape.
- P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION 26 0519

SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

1.2 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.2 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
 - 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
 - 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 - 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 - 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
 - 4. Manufacturers - Mechanical and Compression Connectors:
 - a. allG Fabrication; _____: www.allgfab.com/#sle.
 - b. Burndy LLC; _____: www.burndy.com/#sle.
 - c. Harger Lightning & Grounding; _____: www.harger.com/#sle.
 - d. nVent ERICO; _____: www.nvent.com/#sle.
 - e. Thomas & Betts Corporation; _____: www.tnb.com/#sle.
 - 5. Manufacturers - Exothermic Welded Connections:
 - a. Burndy LLC; _____: www.burndy.com/#sle.
 - b. nVent ERICO; Cadweld: www.nvent.com/#sle.
 - c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC; _____: www.thermoweld.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- 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. Perform work in accordance with NECA 1 (general workmanship).

- C. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 26 0553.

END OF SECTION 26 0526

SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.2 RELATED REQUIREMENTS

- A. Section 26 5100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
- B. Section 27 0529 - Hangers and Supports for Communications Systems.

1.3 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Comply with the following. Where requirements differ, comply with most stringent.
 - a. NFPA 70.
 - b. Requirements of authorities having jurisdiction.
 - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
 - 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.
 - 4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported

- with minimum safety factor of _____. Include consideration for vibration, equipment operation, and shock loads where applicable.
5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 6. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.
1. Manufacturers:
 - a. ABB: www.electrification.us.abb.com/#sle.
 - b. Eaton Corporation: www.eaton.com/#sle.
 - c. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 - d. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 2. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 3. Conduit Clamps: Bolted type unless otherwise indicated.
 4. Products:
 - a. Gripple, Inc; Universal Bracket: www.gripple.com/#sle.
 - b. Gripple, Inc; Fast Trak: www.gripple.com/#sle.
 - c. Gripple, Inc; Universal Clamp (Threaded): www.gripple.com/#sle.
- C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
1. Manufacturers:
 - a. ABB: www.electrification.us.abb.com/#sle.
 - b. Eaton Corporation: www.eaton.com/#sle.
 - c. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 - d. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
- D. Metal Channel/Strut Framing Systems:
1. Manufacturers:
 - a. ABB: www.electrification.us.abb.com/#sle.
 - b. Atkore International Inc; Unistrut: www.unistrut.us/#sle.
 - c. Eaton Corporation: www.eaton.com/#sle.
 2. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
 3. Comply with MFMA-4.
- E. Hanger Rods: Threaded, zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2-inch diameter.
 - b. Busway Supports: 1/2-inch diameter.
 - c. Single Conduit up to 1-inch (27 mm) Trade Size: 1/4-inch diameter.
 - d. Single Conduit Larger than 1-inch (27 mm) Trade Size: 3/8-inch diameter.
 - e. Trapeze Support for Multiple Conduits: 3/8-inch diameter.
 - f. Outlet Boxes: 1/4-inch diameter.
 - g. Luminaires: 1/4-inch diameter.

- F. Anchors and Fasteners:
 - 1. Manufacturers - Mechanical Anchors:
 - a. Dewalt: anchors.dewalt.com/#sle.
 - b. Hilti, Inc: www.hilti.com/#sle.
 - c. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.
 - 2. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. 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.
- H. Secure fasteners in accordance with manufacturer's recommended torque settings.
- I. Remove temporary supports.

END OF SECTION 26 0529

SECTION 26 0533.13 - CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Galvanized steel intermediate metal conduit (IMC).
- C. Flexible metal conduit (FMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Galvanized steel electrical metallic tubing (EMT).
- F. Rigid polyvinyl chloride (PVC) conduit.
- G. Electrical nonmetallic tubing (ENT).
- H. Liquidtight flexible nonmetallic conduit (LFNC).

1.2 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete encasement of conduits.
- B. Section 07 8400 - Firestopping.
- C. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- D. Section 26 0529 - Hangers and Supports for Electrical Systems.
- E. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

1.3 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2025.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.
- C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit - Aluminum (ERMC-A); 2025.
- D. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2025.
- E. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing; 2026.

- F. ASTM D3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing; 2024.
- G. ASTM F1055 - Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing; 2016a (Reapproved 2022).
- H. ASTM F2160 - Standard Specification for Solid Wall High Density Polyethylene (HDPE) Conduit Based on Controlled Outside Diameter (OD); 2022a.
- I. ASTM F2176 - Standard Specification for Mechanical Couplings Used on Polyethylene Conduit, Duct and Innerduct; 2017.
- J. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- K. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
- L. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; 2004.
- M. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2025.
- N. NEMA BI 50058 - Electrical Nonmetallic Tubing (ENT); 2014 (Reaffirmed 2019).
- O. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- P. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit; 2018.
- Q. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.
- R. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.
- S. NEMA TC 7 - Solid-Wall Coilable and Straight Electrical Polyethylene Conduit; 2021.
- T. NEMA TC 14 (SERIES) - Reinforced Thermosetting Resin Conduit and Fittings Series; 2015.
- U. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- W. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- X. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.
- Y. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.
- Z. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- AA. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- BB. UL 651A - High Density Polyethylene (HDPE) Conduit; Current Edition, Including All Revisions.

- CC. UL 746C - Polymeric Materials – Use in Electrical Equipment Evaluations; Current Edition, Including All Revisions.
- DD. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- EE. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.
- FF. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.
- GG. UL 1653 - Electrical Nonmetallic Tubing; Current Edition, Including All Revisions.
- HH. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.
- II. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 1. Under Slab on Grade: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), galvanized steel electrical metallic tubing (EMT), or rigid PVC conduit.
 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), galvanized steel electrical metallic tubing (EMT), or rigid PVC conduit.
 3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), galvanized steel electrical metallic tubing (EMT), or rigid PVC conduit.
 4. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) where emerging from underground.

5. Where rigid polyvinyl (PVC) conduit larger than 2-inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit (RMC) elbows or galvanized steel intermediate metal conduit (IMC) elbows for bends.
 6. Where galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) is installed in direct contact with earth where soil has resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
 7. Where galvanized steel electrical metallic tubing (EMT) is installed in direct contact with earth, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
 8. Where galvanized rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT) emerges from concrete into soil, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection for minimum of 4 inches on either side of where conduit emerges.
- D. Embedded Within Concrete:
1. Within Slab on Grade: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT). Embed within structural slabs only where approved by Structural Engineer.
 2. Within Slab Above Ground: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT). Embed within structural slabs only where approved by Structural Engineer.
 3. Within Concrete Walls Above Ground: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT) where emerging from concrete.
 5. Where galvanized steel electrical metallic tubing (EMT) emerges from concrete into salt air, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection for minimum of 4 inches on either side of where conduit emerges.
- E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).

- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC).
 - 1. Locations subject to physical damage include, but are not limited to:
 - a. Where exposed below 8 feet, except within electrical and communication rooms or closets.
 - b. Where exposed below 20 feet in warehouse areas.
- K. Exposed, Interior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC).
 - 1. Locations subject to severe physical damage include, but are not limited to:
 - a. High traffic industrial and warehouse areas where exposed below 8 feet, except within electrical and communication rooms or closets.
 - b. Where exposed below 20 feet in industrial manufacturing areas.
- L. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- M. Exposed, Exterior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC).
 - 1. Exterior locations subject to severe physical damage include, but are not limited to:
 - a. Where exposed to vehicular traffic below 20 feet.
- N. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- O. Flexible Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit (FMC).
 - 1. Maximum Length: 6 feet.
- P. Flexible Connections to Vibrating Equipment:
 - 1. Dry Locations: Use flexible metal conduit (FMC).
 - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
 - 3. Maximum Length: 6 feet unless otherwise indicated.
 - 4. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.
- Q. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC) or galvanized steel electrical metallic tubing (EMT).

2.2 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.

- B. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Branch Circuits: 3/4-inch trade size.
 - 2. Branch Circuit Homeruns: 3/4-inch trade size.
 - 3. Control Circuits: 1/2-inch trade size.
 - 4. Flexible Connections to Luminaires: 3/8-inch trade size.
 - 5. Underground, Interior: 3/4-inch trade size.
 - 6. Underground, Exterior: 1-inch trade size.
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 - 3. Rymco USA: www.rymcousa.com/#sle.
 - 4. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 - 5. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Factory-Painted, Color-Coded Galvanized Steel RMC: Apply according to indicated color code.
 - 1. See Section 26 0553 for color code.
- D. Fittings:
 - 1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.us/#sle.
 - c. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - d. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 - 2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
 - 3. Material: Use steel or malleable iron.
 - 4. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.4 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 - 3. Rymco USA: www.rymcousa.com/#sle.
 - 4. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.

5. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- C. Fittings:
 1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.us/#sle.
 - c. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
 - d. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
 3. Hazardous/Classified Locations: Use fittings listed and labeled as complying with UL 1203 for classification of installed location.
 4. Material: Use steel or malleable iron.
 5. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.5 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.
- B. Fittings:
 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.6 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
 1. AFC Cable Systems, a division of Atkore International: www.afcweb.com/#sle.
 2. Electri-Flex Company: www.electriflex.com/#sle.
 3. International Metal Hose: www.metalhose.com/#sle.
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
 1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
 - c. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 3. Material: Use steel or malleable iron.

2.7 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular/#sle.
 - 3. Rymco USA: www.rymcousa.com/#sle.
 - 4. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 - 5. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Factory-Painted, Color-Coded Galvanized Steel EMT: Apply according to indicated color code.
 - 1. See Section 26 0553 for color code.
- D. Fittings:
 - 1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.us/#sle.
 - c. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
 - d. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Material: Use steel or malleable iron.
 - 4. Connectors and Couplings: Use compression/gland or set-screw type.
 - a. Do not use indenter type connectors and couplings.
 - 5. Embedded Within Concrete, Where Permitted: Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

2.8 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
 - 1. ABB; Carlon: www.carlon.com/#sle.
 - 2. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 3. Cantex Inc: www.cantexinc.com/#sle.
 - 4. Heritage Plastics, a division of Atkore International: www.heritageplastics.com/#sle.
 - 5. JM Eagle: www.jmeagle.com/#sle.
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.9 ELECTRICAL NONMETALLIC TUBING (ENT)

- A. Manufacturers:
 - 1. ABB; Carlon: www.electrification.us.abb.com/#sle.
 - 2. Cantex Inc: www.cantexinc.com/#sle.
- B. Description: NFPA 70, Type ENT electrical nonmetallic tubing complying with NEMA BI 50058 and listed and labeled as complying with UL 1653.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of ENT to be connected.
 - 2. Use solvent-welded type fittings.
 - 3. Solvent-Welded Fittings: Rigid PVC fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; suitable for use with ENT.

2.10 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

- A. Manufacturers:
 - 1. AFC Cable Systems, a division of Atkore International: www.afcweb.com/#sle.
 - 2. Electri-Flex Company: www.electriflex.com/#sle.
 - 3. IPEX, a division of Aliaxis: www.ipexna.com/#sle.
- B. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for type of conduit to be connected.

2.11 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil, 0.020 inch.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- D. Adhesive for HDPE and RTRC Conduit:
 - 1. Specifically designed for bonding dissimilar materials in lieu of transition fittings, including but not limited to polyethylene, fiberglass, PVC, aluminum, and steel; UL 746C recognized.
 - 2. Approved by adhesive manufacturer for use with materials to be joined.
- E. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.
- F. Foam Conduit Sealant:
 - 1. Removable, two-part, closed-cell foam, specifically designed for sealing conduit openings against water, moisture, gases, and dust.

2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 3. Rated to hold minimum of 10 ft water head pressure.
 4. Products:
 - a. American Polywater Corporation; Polywater AFT Foam Duct Sealant: www.polywater.com/#sle.
 - b. American Polywater Corporation; Polywater FST Foam Duct Sealant: www.polywater.com/#sle.
- G. Conduit Mechanical Seals:
1. Listed as complying with UL 514B.
 2. Specifically designed for sealing conduit openings against water, moisture, gases, and dust.
 3. Suitable for sealing around conductors/cables to be installed.
 4. Products:
 - a. American Polywater Corporation; PHRD SG Mechanical Seals: www.polywater-haufftechnik.com/#sle.
- H. Sealing Compound for Hazardous/Classified Location Sealing Fittings: Listed for use with particular fittings to be installed.
- I. Sealing Systems for Concrete Penetrations:
1. Sleeves: Provide water stop ring or cement coating that bonds to concrete to prevent water infiltration.
 2. Rate for minimum of 40 psig; suitable for sealing around conduits to be installed.
 3. Products:
 - a. American Polywater Corporation; PZVR Cement-Coated Concrete Wall Sleeves: www.polywater-haufftechnik.com/#sle.
 - b. American Polywater Corporation; PHSD Mechanical Seals: www.polywater-haufftechnik.com/#sle.
 - c. American Polywater Corporation; PHSI 150 Varia Double Wall Inserts: www.polywater-haufftechnik.com/#sle.
 - d. American Polywater Corporation; PGKD Modular Seals: www.polywater-haufftechnik.com/#sle.
- J. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
1. Products:
 - a. Alta Products, LLC; Sigrist Pipe Chase Housing, Curbs, and Exit Seals: www.altaproductsllc.com/#sle.
 - b. Menzies Metal Products; Electrical Roof Stack and Cap: www.menzies-metal.com/#sle.
 - c. Menzies Metal Products; Electrical Retro Box: www.menzies-metal.com/#sle.
- K. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.
1. Products:
 - a. Quickflash Weatherproofing Products, Inc: www.quickflashproducts.com/#sle.

- L. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.
 - 1. Products:
 - a. HoldRite, a brand of Reliance Worldwide Corporation; HydroFlame Pro Series/HydroFlame Custom Built: www.holdrite.com/#sle.
- M. Duct Bank Spacers: Nonmetallic; designed for maintaining conduit/duct spacing for concrete encasement in open trench installation; suitable for conduit/duct arrangement to be installed.
 - 1. Products:
 - a. Advance Products & Systems, LLC; Duct Bank Spacers: www.apsonline.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- 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. Install conduit in accordance with NECA 1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Intermediate Metal Conduit (IMC): Install in accordance with NECA 101.
- E. Rigid Polyvinyl Chloride (PVC) Conduit: Install in accordance with NECA 111.
- F. Electrical Nonmetallic Tubing (ENT): Install in accordance with NECA 111.
- G. Liquidtight Flexible Nonmetallic Conduit (LFNC): Install in accordance with NECA 111.
- H. Conduit Routing:
 - 1. When conduit destination is indicated without specific routing, determine exact routing required.
 - 2. Conceal conduits unless specifically indicated to be exposed.
 - 3. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 - c. Within joists in areas with no ceiling.
 - 4. Unless otherwise approved, do not route exposed conduits:
 - a. Across roofs.
 - b. Across top of parapet walls.
 - c. Across building exterior surfaces.

5. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 6. Arrange conduit to maintain adequate headroom, clearances, and access.
 7. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
 8. Arrange conduit to provide no more than 150 feet between pull points.
 9. Route conduits above water and drain piping where possible.
 10. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 11. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
 12. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
 - c. Flues.
 13. Group parallel conduits in same area on common rack.
- I. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 26 0529.
 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
 7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
 8. Use nonpenetrating rooftop supports to support conduits routed across rooftops, where approved.
 9. Use of spring steel conduit clips for support of conduits is not permitted.
 10. Use of wire for support of conduits is not permitted.
- J. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.

6. Where spare conduits stub up through concrete floors and are not terminated in box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
 7. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
 8. Secure joints and connections to provide mechanical strength and electrical continuity.
- K. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Provide suitable sealing system where conduits penetrate exterior wall below grade.
 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
 8. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 07 8400.
- L. Underground Installation:
1. Provide trenching and backfilling; see Section 31 2316.13.
 2. Provide underground warning tape along entire conduit length for service entrance where not concrete-encased; see Section 26 0553.
- M. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
1. Maximum Conduit Size: 1-inch trade size unless otherwise approved.
 2. Secure conduits to prevent floating or movement during pouring of concrete.
- N. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- O. Conduit Sealing:
1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
 - a. Where conduits enter building from outside.
 - b. Where service conduits enter building from underground distribution system.
 - c. Where conduits enter building from underground.
 - d. Where conduits may transport moisture to contact live parts.

2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
 - a. Where conduits pass from outdoors into conditioned interior spaces.
 - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
 - c. Where conduits penetrate coolers or freezers.
3. Where conduits cross boundaries of hazardous/classified locations, provide identified/listed sealing fittings or conduit mechanical seals as approved by authorities having jurisdiction; locate as indicated or in accordance with NFPA 70.

P. Provide grounding and bonding; see Section 26 0526.

Q. Identify conduits; see Section 26 0553.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.
- D. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION 26 0533.13

SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 2 PRODUCTS

1.1 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - 2. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
 - a. Service equipment.
 - b. Industrial control panels.
 - c. Motor control centers.
 - d. Elevator control panels.
 - e. Industrial machinery.
- B. Identification for Conductors and Cables:
 - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
 - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

1.2 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 - 1. Materials:
- B. Identification Labels:
 - 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

1.3 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 - 1. Materials:
 - 2. Minimum Size: 7 by 10 inches unless otherwise indicated.
- C. Warning Labels:

1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
3. Minimum Size: 2 by 4 inches unless otherwise indicated.

END OF SECTION 26 0553

SECTION 26 0583 - WIRING CONNECTIONS

PART 2 PRODUCTS

1.1 EQUIPMENT CONNECTIONS

END OF SECTION 26 0583

SECTION 26 2416 - PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Power distribution panelboards.
- B. Load centers.
- C. Overcurrent protective devices for panelboards.

1.2 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 0573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.
- E. Section 26 2200 - Low-Voltage Transformers: Small power centers with integral primary breaker, transformer, and panelboard.
- F. Section 26 2713 - Electricity Metering: For interface with equipment specified in this section.
- G. Section 26 2813 - Fuses: Fuses for fusible switches and spare fuse cabinets.
- H. Section 26 4300 - Surge Protective Devices.

1.3 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2025.
- D. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- E. NEMA PB 1 - Panelboards; 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000V or Less; 2023.
- G. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.

- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- K. UL 67 - Panelboards; Current Edition, Including All Revisions.
- L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- M. UL 1053 - Ground-Fault Sensing and Relaying Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
 - 4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
 - 1. Include characteristic trip curves for each type and rating of overcurrent protective device upon request.
- C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
 - 1. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Panelboard Keys: Two of each different key.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. ABB: www.electrification.us.abb.com/#sle.
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Schneider Electric: www.se.com/#sle.
- D. Siemens Industry, Inc: www.new.siemens.com/#sle.

2.2 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 1. Altitude: Less than 6,600 feet.
 2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
- C. Short Circuit Current Rating:
 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
 2. Listed series ratings are acceptable, except where not permitted by motor contribution according to NFPA 70.
 3. Label equipment utilizing series ratings as required by NFPA 70.
- D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
 2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- G. Conductor Terminations: Suitable for use with the conductors to be installed.
- H. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 3R.
 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 - b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- J. Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.
1. Where electronic circuit breakers equipped with integral ground fault protection are used, provide separate neutral current sensor where applicable.

2.3 PANELBOARDS - SPECIFIC REQUIREMENTS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
1. Phase and Neutral Bus Material: Copper.
 2. Ground Bus Material: Copper.
- D. Circuit Breakers:
1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
 2. Provide electronic trip circuit breakers where indicated.
- E. Enclosures:
1. Provide surface-mounted enclosures unless otherwise indicated.
 2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 3. Provide clear plastic circuit directory holder mounted on inside of door.

2.4 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:

1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 - c. Series Rated Systems: Provide circuit breakers listed in combination with upstream devices to provide interrupting rating not less than the short circuit current rating indicated.
3. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 26 0529.
- F. Install panelboards plumb.
- G. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- H. Provide grounding and bonding in accordance with Section 26 0526.

- I. Install all field-installed branch devices, components, and accessories.
- J. Set field-adjustable ground fault protection pickup and time delay settings as indicated.
- K. Provide filler plates to cover unused spaces in panelboards.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.
- D. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
- E. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.4 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.
- C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.5 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION 26 2416

SECTION 26 2726 - WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Wall dimmers.
- C. Receptacles.
- D. Wall plates and covers.
- E. Floor box service fittings.
- F. Poke-through assemblies.

1.2 RELATED REQUIREMENTS

- A. Section 09 6900 - Access Flooring.
- B. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- C. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- D. Section 26 0533.16 - Boxes for Electrical Systems.
- E. Section 26 0533.23 - Surface Raceways for Electrical Systems: Surface raceway systems, including multioutlet assemblies.
- F. Section 26 0539 - Underfloor Raceways for Electrical Systems.
- G. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- H. Section 26 0583 - Wiring Connections: Cords and plugs for equipment.
- I. Section 26 0923 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.
- J. Section 26 2723 - Indoor Service Poles.
- K. Section 26 2913 - Enclosed Controllers: Manual motor starters and horsepower rated motor-starting switches without overload protection.
- L. Section 27 1000 - Structured Cabling: Voice and data jacks.

1.3 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2014h (Validated 2022).

- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification); 2017g (Validated 2023).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- L. UL 1310 - Class 2 Power Units; Current Edition, Including All Revisions.
- M. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.
- N. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.
- O. UL 1917 - Solid-State Fan Speed Controls; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
 - 3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
 - 4. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
 - 5. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
 - 1. Wall Dimmers: Include derating information for ganged multiple devices.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Extra Wall Plates: One of each style, size, and finish.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.
- C. Product Evaluation and Listing Organization Qualifications: Organization engaged in evaluation of products and services, including those recognized by OSHA as Nationally Recognized Testing Laboratories (NRTL), and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 WIRING DEVICES - GENERAL REQUIREMENTS

- A. Provide wiring devices suitable for intended use with ratings adequate for load served.
- B. Wiring Device Applications:
 1. Receptacles Installed Outdoors or in Damp or Wet Locations: Use weather-resistant GFCI receptacles with weatherproof covers.
 2. Receptacles Installed in Dwelling Units: Use tamper-resistant receptacles.
 3. Provide GFCI protection for:
 - a. Receptacles installed within 6 feet of sinks.
 - b. Receptacles installed in kitchens.
- C. Wiring Device Finishes:
 1. Provide wiring device finishes as described below, unless otherwise indicated.
 2. Wiring Devices, Unless Otherwise Indicated: White with white nylon wall plate.
 3. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate.
 4. Wiring Devices Installed in Wet or Damp Locations: White with weatherproof cover.
 5. Wiring Devices Connected to Emergency Power: Red with red nylon wall plate.

2.2 WALL SWITCHES

- A. General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- B. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.3 RECEPTACLES

- A. Manufacturers:
 1. Hubbell Incorporated; _____: www.hubbell.com/#sle.

2. Leviton Manufacturing Company, Inc; _____: www.leviton.com/#sle.
 3. Lutron Electronics Company, Inc; Designer Style: www.lutron.com/#sle.
 4. Pass & Seymour, a brand of Legrand North America, Inc; _____: www.legrand.us/#sle.
- B. General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
 2. NEMA configurations specified are according to NEMA WD 6.
 3. Hospital Grade Receptacles: Listed as complying with UL 498 Supplement SD, with green dot hospital grade mark on device face.
- C. Convenience Receptacles:
1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
 2. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
 3. Tamper Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; single or duplex as indicated on the drawings.
- D. GFCI Receptacles:
1. General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - a. Provide test and reset buttons of same color as device.
 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
 - a. Products:
 - 1) Hubbell Incorporated; Model _____: www.hubbell.com/#sle.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
 3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations.
- E. USB Charging Devices:
1. General Requirements: Listed as complying with UL 1310.
 2. USB Charging/Tamper Resistant Receptacle Combination Devices: Two-port (Type A) USB charging device and receptacle, commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; rectangular decorator style.
 - a. Products:
 - 1) Hubbell Incorporated; Model _____: www.hubbell.com/#sle.

2.4 FLOOR BOX SERVICE FITTINGS

- A. Manufacturers:
1. Hubbell Incorporated; _____: www.hubbell.com/#sle.

2. Wiremold, a brand of Legrand North America, Inc; _____: www.legrand.us/#sle.
- B. Description: Service fittings compatible with floor boxes provided under Section 26 0533.16 with components, adapters, and trims required for complete installation.

2.5 POKE-THROUGH ASSEMBLIES

- A. Manufacturers:
 1. Hubbell Incorporated; _____: www.hubbell.com/#sle.
 2. Wiremold, a brand of Legrand North America, Inc; _____: www.legrand.us/#sle.
- B. Description: Assembly comprising floor service fitting, poke-through component, fire stops and smoke barriers, and junction box for conduit termination; fire rating listed to match fire rating of floor and suitable for floor thickness where installed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- I. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- J. Install wall switches with OFF position down.
- K. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- L. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- N. Install poke-through closure plugs in each unused core holes to maintain fire rating of floor.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- D. Test each receptacle to verify operation and proper polarity.
- E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- F. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.4 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.5 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION 26 2726

SECTION 26 5100 - INTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior luminaires.

1.2 RELATED REQUIREMENTS

- A. Section 26 0529 - Hangers and Supports for Electrical Systems.
- B. Section 26 0533.16 - Boxes for Electrical Systems.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 0923 - Lighting Control Devices.
- E. Section 26 2726 - Wiring Devices: Manual wall switches and wall dimmers.
- F. Section 26 5600 - Exterior Lighting.

1.3 REFERENCE STANDARDS

- A. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; 2021.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2025.
- D. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- H. UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits; Current Edition, Including All Revisions.
- I. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
 2. Provide photometric calculations where luminaires are proposed for substitution upon request.
- C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.8 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

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

- B. Provide 3-year manufacturer warranty for LED luminaires, including drivers.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.

2.2 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.
- B. Install products in accordance with manufacturer's instructions.
- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).

- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Install accessories furnished with each luminaire.
- G. Bond products and metal accessories to branch circuit equipment grounding conductor.
- H. Exit Signs:
 - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- I. Install lamps in each luminaire.

3.3 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
- B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.
- C. Air-Handling Luminaires with Air Control Blades or Heat Removal Dampers: Adjust as indicated or as required for proper airflow as directed by Architect.
- D. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

3.4 CLEANING

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.5 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. See Section 01 7900 - Demonstration and Training, for additional requirements.

3.6 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

END OF SECTION 26 5100

SECTION 27 1000 - STRUCTURED CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Communications system design requirements.
- B. Communications pathways.
- C. Copper cable and terminations.
- D. Communications outlets.
- E. Communications grounding and bonding.
- F. Communications identification.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- C. Section 26 0533.16 - Boxes for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products.
- E. Section 26 2726 - Wiring Devices.
- F. Section 27 0533.13 - Conduit for Communications Systems.

1.3 REFERENCE STANDARDS

- A. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition; 2019.
- B. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; 2005e.
- C. FM (AG) - FM Approval Guide; Current Edition.
- D. ICEA S-83-596 - Indoor Optical Cable; 2021.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2024.
- G. TIA-568.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2024e.
- H. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).

- I. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2021d.
- J. TIA-607 - Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2024e.
- K. UL 444 - Communications Cables; Current Edition, Including All Revisions.
- L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.
- M. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
 - 2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
 - 3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- C. Sustainable Design Documentation: Submit manufacturer's product data on cable and cable insulation showing compliance with specified lead content requirements.
- D. Evidence of qualifications for installer.
- E. Field Test Reports.

1.6 QUALITY ASSURANCE

- A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- B. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
 - 1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
 - 2. Supervisors and installers factory certified by manufacturers of products to be installed.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep stored products clean and dry.

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 2 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
 - 1. Comply with TIA-568 (SET) (cabling) and TIA-569 (pathways) (commercial standards).
 - 2. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
 - 3. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
 - 4. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. Main Distribution Frame (MDF): Centrally located support structure for terminating horizontal cables that extend to telecommunications outlets, functioning as point of presence to external service provider.
 - 1. Locate main distribution frame as indicated on the drawings.
- C. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.2 PATHWAYS

- A. Conduit: See section 27 0533.13.

2.3 COPPER CABLE AND TERMINATIONS

- A. Manufacturers:
 - 1. Belden: www.belden.com/#sle.
 - 2. CommScope: www.commscope.com/#sle.
 - 3. General Cable Technologies Corporation: www.generalcable.com/#sle.
 - 4. Siemon Company: www.siemon.com/#sle.
 - 5. Panduit www.panduit.com.
 - 6. Or Approved Equal..
- B. Copper Horizontal Cable:

1. Description: 100 ohm, balanced twisted pair cable complying with TIA-568.2 and listed and labeled as complying with UL 444.
 2. Cable Type - Voice and Data: TIA-568.2 Category 6 UTP (unshielded twisted pair); 23 AWG. Use Category 6a for wireless access points.
 3. Cable Capacity: 4-pair.
 4. Cable Applications: Use listed NFPA 70 Type CMP plenum cable unless otherwise indicated.
 5. Cable Jacket Color - Voice and Data Cable: Blue.
 6. Product(s):
 - a. General Cable Technologies Corporation; GenSPEED Cables: www.generalcable.com/#sle.
 - b. Panduit: Pan-Net TX6 Category 6 UTP Cable
- C. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.
- D. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.
1. Performance: 500 mating cycles.
 2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.
 3. Product(s):
 - a. Panduit; Mini-Com TX6 Category 6 Jack

2.4 COMMUNICATIONS OUTLETS

- A. Manufacturers:
1. CommScope: www.commscope.com/#sle.
 2. Siemon Company: www.siemon.com/#sle.
 3. Panduit: www.panduit.com
- B. Outlet Boxes: Comply with Section 26 0533.16.
1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
 2. Minimum Size, Unless Otherwise Indicated:
 - a. Data or Combination Voice/Data Outlets: 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.
- C. Wall Plates:
1. Comply with system design standards and UL 514C.
 2. Accepts modular jacks/inserts.
 3. Capacity:
 - a. Data or Combination Voice/Data Outlets: 8 ports.
 4. Wall Plate Material/Finish - Flush-Mounted Outlets: Match wiring device and wall plate finishes specified in Section 26 2726.

2.5 GROUNDING AND BONDING COMPONENTS

- A. Comply with TIA-607.

- B. Comply with Section 26 0526.

2.6 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606.
- B. Comply with Section 26 0553.

2.7 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Factory test cables according to TIA-568 (SET).

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), BICSI N1, NFPA 70, and SYSTEM DESIGN as specified in PART 2.
- B. Comply with Communication Service Provider requirements.
- C. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.
- D. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

3.2 INSTALLATION OF PATHWAYS

- A. Install pathways with the following minimum clearances:
 - 1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
 - 2. 12 inches from power conduits and cables and panelboards.
 - 3. 5 inches from fluorescent and high frequency lighting fixtures.
 - 4. 6 inches from flues, hot water pipes, and steam pipes.
- B. Outlet Boxes:
 - 1. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of telecommunications outlets provided under this section.
 - a. Mounting Heights: Unless otherwise indicated, as follows:
 - 1) Telephone and Data Outlets: 18 inches above finished floor.
 - 2) Telephone Outlets for Side-Reach Wall-Mounted Telephones: 54 inches above finished floor to top of telephone.
 - 3) Telephone Outlets for Forward-Reach Wall-Mounted Telephones: 48 inches above finished floor to top of telephone.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
 - 1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
 - 2. Do not over-cinch or crush cables.
 - 3. Do not exceed manufacturer's recommended cable pull tension.
 - 4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
 - 1. At Distribution Frames: 120 inches.
 - 2. At Outlets - Copper: 12 inches.
- C. Copper Cabling:
 - 1. Category 5e and Above: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
 - 2. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.
 - 3. Use T568B wiring configuration.
- D. Identification:
 - 1. Use wire and cable markers to identify cables at each end.
 - 2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.

3.4 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Comply with inspection and testing requirements of specified installation standards.
- C. Visual Inspection:
 - 1. Inspect cable jackets for certification markings.
 - 2. Inspect cable terminations for color coded labels of proper type.
 - 3. Inspect outlet plates and patch panels for complete labels.
- D. Testing - Copper Cabling and Associated Equipment:
 - 1. Test backbone cables after termination but before cross-connection.
 - 2. Test backbone cables for DC loop resistance, shorts, opens, intermittent faults, and polarity between connectors and between conductors and shield, if cable has overall shield.
 - 3. Test operation of shorting bars in connection blocks.
 - 4. Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.
- E. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION 27 1000

SECTION 27 41 00 –AUDIO VIDEO SYSTEMS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

- A. For the sake of brevity these specifications shall omit phrases such as "(Sub)Contractor shall furnish and install", "unless otherwise indicated or specified", etc., but these phrases are nevertheless implied. Mention of materials and operations requires the (Sub) Contractor to furnish and install such materials and perform such operations complete to the satisfaction of the Systems Designer. Exceptions are noted herein or shown on the drawings.
- B. No representative of the Owner shall have power to waive the obligations of this Contract for the furnishing of good materials or of performing good work, as herein described, in full accordance with the Contract Documents. The failure of any representative of the Owner to condemn any defective work or materials shall not release the obligation to at once tear out, remove, and properly replace the same at any time prior to final acceptance and upon discovery of said defective work or material. However, when requested, the Owner's representative shall observe and accept or reject any material furnished; and in the event the material has been once accepted by the Owner's representative, such acceptance shall be binding on the Owner unless it can be clearly shown that such material does not meet the specifications for this work.
- C. Definitions of terms in this specification section are as follows:
 - 1. "Owner" or "End User" is Minot State University.
 - 2. "Architect" is the architect of record for this project, EPAC Architecture.
 - 3. "Systems Designer" is the designer of the systems in this specification section, Schuler Shook.
 - 4. "Electrical Engineer" is the engineer and designer of the associated electrical systems, TO BE ENTERED.
 - 5. "General Contractor" or "Contractor" is the Construction Manager or General Contractor, or other entity contractually responsible for the construction of the project and the full and proper completion of this specification section.
 - 6. "Systems Contractor" is the Sub-Contractor, responsible to the General Contractor, who is responsible for performing the scope of work described in this specification section, and in the related contract drawings (see 1.2.B).
 - 7. "Systems" are the audio, video, control, and network systems described in this specification section and in the related contract drawings (see 1.2.B).
- D. The written specification, including all appendices, and the large format audio video drawings are collectively referred to as the contract documents. System components and criteria may be indicated in one location, or possibly in several locations in the contract documents. It is the Contractor's responsibility to obtain clarification from the Systems Designer, prior to submitting bid documents, if the Contractor believes that there is conflict within the documentation, or if clarification of any kind is required. If the Contractor fails to obtain said clarification(s), the

Contractor agrees to abide by the interpretation of the Systems Designer, without remedy for additional compensation.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, other General Requirement Sections, apply to work of this section.
- B. All work shown on Contract Drawings AV series is provided under this section.
- C. Switches, switchboards, contactors, panel boards, transformers, conduit, wire, outlets, connectors and other electrical devices specified herein or on accompanying drawings shall conform to provisions of other sections of Division 26 of the Contract Documents unless otherwise noted. Refer to 1.11 Division of Responsibility Table for additional detailed division of scope.

1.3 SCOPE OF WORK

- A. Work under this section shall include the furnishing of all labor, materials, tools, transportation services, and supervision necessary to complete the installation of the systems and other items as herein listed, all as described in these specifications, as illustrated on the drawings, and as directed by the Systems Designer. Work is comprised of, but not limited to, the following principal Systems:
 - 1. Audio Systems
 - 2. Video Systems
 - 3. ADA Assistive Listening Systems
 - 4. Video Wall Systems
 - 5. AV Infrastructure
 - 6. AV Control Systems
 - 7. Livestream AV Systems
- B. The contract documents show design intent and signal flow and are not meant to be fully detailed installation drawings. It is the responsibility of the Systems Contractor to provide fully detailed installation drawings for review and approval by the Systems Designer (see submittal requirements below). It is understood and agreed to by the Contractor that the work described in the contract documents shall be fully and properly installed and must be a complete and working system per the requirements indicated in these contract documents.
- C. Consistent with the detailed information contained in this specification, it is the responsibility of the Contractor to supply complete and functional overall systems. Verify complete parts lists, the accuracy of the type numbers and the overall suitability of the equipment to provide functional systems coordinated and interfaced with related work. Provide repeaters, additional switches, and similar equipment as needed for cable length limitations. Other items that are included in the scope of work but may not be fully detailed in the contract documents include, but are not limited to, hardware, rigging devices and supplies, transformers, distribution amplifiers, signal format converters, connectors, patch cords, jumpers, network, or other device SFP modules, and other devices necessary for device interfacing, isolation, installation, or gain structure.

- D. Minor items of equipment needed to meet the requirements stated above, even if not specifically mentioned herein or on the drawings, shall be provided in quality equivalent to other conditions on the project with no claim for additional payment.
- E. Furnish Shop Drawings (see details in Submittals sections below) to the Systems Designer and Architect for review. All purchase of equipment, and/or fabrication or installation work performed without fully approved shop drawings is done so at the Contractor's risk. Any at risk work as described above may be rejected and if so, all cost associated with the removal of unapproved work, and replacement with approved work is not eligible for reimbursement or additional charge. This includes Division 26 electrical systems and conduit that is required to be provided to support the work described in this section. Conduit drawings related to this scope of work are required to be submitted by the Division 26 sub-contractor, with input and coordination from the Systems Contractor and Contractor, and approved by the Systems Designer and Electrical Engineer, prior to any of the work described above being performed. Any work done prior to approval of the conduit drawings submittal is at risk and any remedial work or replacement work required by the Systems Contractor and/or Electrical Engineer to correct deficiencies in unapproved work must be performed at the Contractor's cost and is not eligible for reimbursement or additional charge.
- F. Furnish and install complete Systems with all necessary apparatus and equipment, wiring, etc., required to ensure complete systems in excellent working order as specified herein and on the attached diagrams.
- G. Furnish all back boxes and enclosures for audio video systems panels and control devices, to be installed by Division 26 sub-contractor. Coordinate with Division 26 sub-contractor to verify proper location, orientation, and installation conditions of all back boxes and enclosures to meet project requirements. Refer to 1.11 Division of Responsibility Table and to project documentation for details.
- H. Furnish, install, and terminate all low voltage wire and cable included in this specification section. This does not include AC power system distribution and terminations, except as expressly called out in these specifications or in the audio video drawings.
- I. Systems Contractor is responsible for frequency scanning and coordination of any existing audio video systems devices, or audio video systems devices provided by Owner, with any new wireless transmitters and receivers. Coordinate with Contractor and Owner as necessary accounting for local frequencies already in use by other entities, and accounting for available spectrum. Provide Owner with a complete listing of all wireless equipment referenced above, and the frequencies assigned to the devices, as well as providing a list of available open frequencies for all devices that are tunable.
- J. Systems Contractor must provide Control System and Digital Signal Processing (DSP) system programming and graphical user interface designs, along with any other specialized programming requirements listed or indicated in the drawings, and/or specifications, including specification appendices. Systems Contractor will provide a full set of said programming, fully tested, installed, functioning and ready for inspection prior to Systems Commissioning and Testing. Systems Contractor will then provide a full set of changes, adjustments, and additions to address any deficiencies, or changes requested by the Systems Designer during Systems Commissioning and Testing prior to turnover to the Owner. Systems Contractor

will also provide one additional full set of changes and adjustments to meet requests and notes from the Owner during the last third of the initial warranty period. All of this work is part of the base scope of work covered by these contract documents. Changes required to support additional equipment added to the systems during warranty period, that is not part of the work in these contract documents is not included in the work described above. Any such work should be proposed to the Owner with the costs for that work for the Owner to approve prior to work being performed.

- K. Perform all initial systems settings and required Systems Contractor testing (see paragraphs 3.10, 3.11, and 3.12 below) and submit all required test reports, and a Declaration of Audio Video Systems Completion.
- L. Provide any required manufacturer training or commissioning (see paragraphs 3.14 below)
- M. Participate, along with manufacturer's representatives (if required), in Systems Designer Commissioning, Testing, and Systems Adjustments.
- N. Remedy all outstanding punch list items prior to Owner training.
- O. Provide training sessions, as required in paragraph 3.14 below, to the Owner's Designated Staff.
- P. Provide systems documentation, as required in paragraph 3.15 below, to the Systems Designer for review and approval.
- Q. Provide systems documentation to the Owner, as required in paragraph 3.15 below, corrected per any notes from the Systems Designer.
- R. Warranty all equipment, components, and workmanship per the warranty requirements in paragraph(s) 1.7 below.
- S. Contract documents for work in this section includes references to supporting work to be provided by other divisions and specification sections. That work is NOT included in this scope of work and is only referenced to show related work to assist in coordination. Refer to the Division of Responsibility Table in paragraph 1.11 for detailed information on division of related labor between sub-contractors. The Contractor is ultimately responsible for completion of all this scope of work and any related supporting scopes of work.

1.4 JOB CONDITIONS

- A. Verify all conditions on jobsite applicable to this work. Coordinate with scheduled work of other trades. Notify Systems Designer in writing of discrepancies, conflicts, or omissions prior to commencement of work or correct same at Contractor's expense.
- B. The drawings show diagrammatically the cables, conduit, wiring, and so far as possible, the arrangement of equipment, which fit into the spaces available without interference. If conditions exist at the jobsite which make it impossible to install work as shown, prepare and submit drawings to the Systems Designer for approval showing how the work may be installed and, on approval, install the work without additional cost to the Owner.

- C. Contractor and their sub-contractors shall take care not to damage any equipment or to disconnect any wiring other than as required to interface new system. Any contractor-damaged equipment shall be repaired or replaced by the Contractor at no cost to the Owner.
- D. The Systems Contractor must keep the job adequately staffed at all times.
- E. For no reason other than illness, loss of personnel, or other circumstances completely outside the control of the Systems Contractor, the Project Engineer, Project DSP and Control Systems Programmers, and the Lead Installer shall remain with the project from beginning through completion. In cases where a change must occur, the same pre-bid requirements for CTS-D and CTS-I certification apply to the new staff members, and in anything other than a catastrophic and immediate loss, there must be a minimum of a one week overlap between personnel on the project. The Systems Contractor MUST provide the Systems Designer, notice of any change, including a general reason for the change, and a detailed plan as to how the continuity of information will be achieved. This requirement does not apply to staff other than those directly named above.
- F. The Contractor is responsible to perform all cutting, patching, and painting or other work necessary to match finish treatments during installation of the systems and to repair any damage done as a result of installation of the systems. The Contractor is responsible for all cleanup and trash removal from all systems work areas.
- G. The Systems Contractor will cooperate with the Contractor and any or all sub-contractors and the Owner, Owner's Representative, and all other appropriate parties to coordinate progress with the overall construction schedule. Watch for conflicts with work by other contractors on the job. Without claim for additional payment, make moderate moves or changes as are necessary to accommodate other equipment or to maintain aesthetic appearance.
- H. The Contractor will provide and maintain fully finished, dust free and conditioned spaces for all control rooms and rack locations prior to any installation of systems racks or electronics. In addition the Contractor must provide adequate protection to installed loudspeakers, displays, projectors, cameras, and other systems equipment to protect them from damage and from dust or exposure to other contaminants, such as water or paint overspray.

1.5 SUBMITTALS

- A. Pre-Bid Submittals
 - 1. All Systems Contractors providing bid responses for the systems specified in this section must provide the following documentation for review no later than ten (10) days prior to the bid due date, and must be deemed qualified, in writing, by the Systems Designer.
 - a. A list of projects performed within the last four years of comparable size, and scope (minimum four projects). For each project provide the project name and address, dates of construction start and completion, and a name and phone number for a contact representing the Owner or User.
 - b. A description of the Systems Contractor's facilities used for, and capabilities in the following areas:

- i. Shop fabrication
- ii. Rack assembly and wiring
- iii. Equipment repair
- iv. Systems servicing
- v. Creation of CAD, REVIT, or other graphics documentation for shop drawings and as-built drawings
- c. Resume listing education and experience of the staff member (or members) who will be the project engineer.
- d. Current CTS-D certificate(s) for the staff member(s) in item c. above.
- e. Resume listing education and experience of the staff member (or members) who will be the lead installer on-site. The lead installer must be present on-site at all times when installation work is being performed.
- f. Current CTS-I certificate(s) for the staff member(s) in item e. above.

B. Bid Submittals

- 1. Contractors must carefully examine all drawings and specifications for this project. No allowances will be made for failure to read and understand all of the project documentation.
- 2. Requests for clarification during the bid process must be submitted in writing, directed to the proper contact. Do not contact the Systems Designer directly. All requests for clarifications must be made no later than seven (7) working days prior to the bid submission date.
- 3. Bid proposals must include all of the systems equipment as specified, and all work effort required to engineer and install the systems to meet the specification and drawing requirements. They must also include any other materials, equipment, and labor that may not be shown that is required to deliver a fully functioning and operable systems per the intent of the specifications and drawings.
- 4. Substitutions of equipment in the design are not allowed during the bid process. The Systems Contractor may provide alternative equipment as options in their submittal, but they must provide a complete bid response based on the systems as designed, with the options shown separately (See 1.5.B.6.e below).
- 5. The scope of work indicated in this specification and the AV drawings must be performed by the Systems Contractor and may not be sub-contracted or assigned to others unless the following requirements are satisfied:
 - a. All sub-contractors must be bound by the terms of this specification including bidding and qualification requirements and must agree to this in writing as part of the bid response package.
 - b. The names of all proposed sub-contractors and a statement of their qualifications (see 1.5.A.1 in its entirety above) must be included in the bid response package.
- 6. All bid response packages must include the following information, in its entirety, or they will be rejected, in whole, as unresponsive:
 - a. An itemized list of all equipment and materials to be used in the installation of the systems in this scope of work. This list must include a short item description, item name, and manufacturer's name, quantity of items included, and a unit price for that item. Lot prices may be used instead of unit prices only for miscellaneous

items not included in the list of specified equipment. Any manufacturer quotes referenced in the equipment list in this specification section must be broken out into unit descriptions as described above.

- b. A labor breakdown as follows:
 - i. Pre-installation engineering (includes shop drawings and other documentation as well as submittals)
 - ii. Coordination meetings, site coordination, and supervision
 - iii. Shop engineering and assembly
 - iv. Shop programming time
 - v. Site installation work
 - vi. Site programming time
 - vii. Systems Contractor verification of systems
 - viii. Systems Designer commissioning and tuning
- c. Total contract price for the base project as designed
- d. Total contract price for each add alternate as designed
- e. For each of any proposed options provide the following:
 - i. Itemized list of equipment from the design that will be replaced by the option with the same information required in 1.5.B.6.a above.
 - ii. Lump sum labor cost attached to the list of equipment from the design that will be replaced by the option.
 - iii. Itemized list of equipment that will replace the equipment listed above in item I, with the same information required in 1.5.B.6.a above.
 - iv. Lump sum labor cost attached to the list of equipment from the option.
 - v. Total Add or Deduct amount from the Base Bid if this option is selected.

C. Pre-Installation Submittals

- 1. The following guidelines must be adhered to for all submittals to be reviewed:
 - a. All shop drawings must be sized such that the paper size matches that of all other project construction drawings. All drawings must be legible when printed at ½ actual size.
 - b. Drawings should be done in black and white. Color may only be used to indicate specific signal types in single-line drawings, but in that case, they must still be legible with all information clearly seen if printed in black and white.
 - c. Drawings and all other submittal documentation should be provided in PDF format. DWG files and Revit models must be provided upon request. All drawings shall be produced in AutoCAD or Revit or in a compatible software that can produce accurate files that are compatible with AutoCAD or Revit.
 - d. Submittal of contract drawings or copied portions of contract drawings as shop drawings is not allowed and they will be rejected. Use of electronic files generated by other parties (Systems Designer drawings or architectural backgrounds, for example) does not release the Systems Contractor from the responsibility to provide accurate, fully engineered, coordinated, and functional

- systems and complete solutions. The Contractor and Systems Contractor must provide systems that meet or exceed all contract document requirements.
- e. All revised submittals must include a revision number and date. All changed drawings or documents must clearly indicate the revision number and date, and all changed items must be clouded and tagged with the revision number. All subsequent revisions must have prior revisions clouds and tags removed for clarity. Drawings or documents included in a revised submittal that have NOT changed must not be marked as revised. Revisions that are not properly tagged may not get reviewed. This does not release the Systems Contractor from the responsibility to provide all revisions as are indicated in submittal responses.
 - f. All submittals must reflect the project awarded, as a whole, including all Owner accepted add/deduct alternates, all Systems Designer approved, Owner accepted Systems Contractor options proposed at bid, and all Systems Designer approved, Owner accepted post-bid, pre-installation, Systems Contractor proposed substitutions.
2. Every Submittal must include, as the first sheet, a table of contents of what all is provided within that particular submittal.
3. Submittal submissions must follow the following schedule:
- a. List of Activities Submittal: Within 30 days of award the Systems Contractor must provide work effort documentation that includes:
 - i. List of activities that require coordination with the Owner
 - ii. List of activities that require coordination with the Architect
 - iii. List of activities that require coordination with the Systems Designer
 - iv. List of activities that require coordination with the Contractor and other trades.
 - v. List of all key procurement items and drop-dead dates for procurement and delivery to maintain schedule.
 - vi. Schedule indicating all of the items listed in items a. through e. above and indicating critical path.
 - vii. All activities related to coordination listed in a. through d. above must be examined and agreed upon by all other parties prior to submittal.
 - b. Substitution Request Submittal: Within 30 days of award the Systems Contractor must submit all post-bid, pre-installation period substitution requests per the following requirements:
 - i. Substitutions may only be incorporated into the design upon acquiring written consent and stamped approved substitution submittal documents from the Systems Designer.
 - ii. Substitution products/systems must be equivalent or better than specified products/systems in quality, performance, function, warranty, and conformance to system requirements.
 - iii. After the 30 day period mentioned above, the only Systems Contractor proposed substitutions that will be reviewed for approval are those required to replace discontinued

- products or products that cannot be procured in time to avoid project delays.
- iv. No substitution may be approved without providing the following information for review:
 - a) List of any advantages to the Owner
 - b) List of any disadvantages to the Owner or lost functionality, whether that functionality is required by the systems design or not.
 - c) Printed specifications and/or laboratory test data for the substitution product AND the original product.
 - d) Description of previous field use and successes and failures.
 - e) Global cost savings reflecting total cost of equipment and labor and other costs incurred by changes in other Contractor's scope of work to support the substitution.
 - f) Unit price of each proposed item, and of the item being replaced.
 - g) In rare instances, the Systems Designer may request a sample of a proposed substitution for evaluation to determine acceptability as a substitute. In this situation, the Systems Contractor will procure and ship the sample to the Systems Designer, at the Systems Contractor's cost. The Systems Designer will evaluate the sample and then return it to the Systems Contractor. If the Systems Designer agrees, the sample may be provided by the manufacturer directly, at their cost, for evaluation.
 - v. The Systems Designer is the only party that may determine if a proposed substitution is acceptable. If the Systems Designer determines that the substitution is not acceptable, the Systems Contractor must provide the specified product from the contract documents.
 - vi. Where a substitute material or method is approved, the Contractor must make all changes to accommodate the substitution with no claim for additional payment beyond that included in item iv. e) above.
 - vii. The Systems Designer reserves the right to substitute new products for products specified in the contract documents provided there is no material cost increase to the Contractor and the Contractor has not purchased the originally specified equipment.
 - c. Conduit Riser Diagram Submittal: Within 45 days of award the Electrical Contractor and Systems Contractor must provide the conduit riser diagrams submittal. This submittal is the responsibility of the Electrical Contractor to create and submit, with input from the Systems Contractor. Any conduit installed prior to receiving a stamped approval of the riser submitted is at risk, and if it is found to be deficient, it must be removed and properly installed per specifications and per the approved riser, at the sole cost of the Contractor.

- d. Equipment List and Product Data Submittal: Within 60 days of award the Systems Contractor must provide the following in a single PDF format document:
 - i. Itemized list of all equipment and materials to be used in assembling the system.
 - ii. Catalog cut sheets or data sheets for each listed item.
 - a) Product data sheets must not be web page captures of specifications, unless there is no other recourse.
 - b) Product data sheets with multiple options or part numbers must clearly be marked with the selection to be used for this project. All options must be called out. Anything the Contractor is not supplying that is shown on the sheet must be called out as an exclusion.
 - iii. Equipment list and product data sheets shall be in the same order as the specification major equipment list in appendix B.
- e. Shop Drawing Submittal: Within 60 days of award the Systems Contractor must provide the following in a single PDF format document:
 - i. Plan and RCP drawings indicating the location of equipment and termination panels.
 - ii. A complete list of all cabling, wire by wire. Each entry in the list must include the unique wire number for that cable, and the termination locations of each end
 - iii. Detailed 3-wire schematic diagrams for any custom circuitry
 - iv. Detailed 3-wire schematic diagrams for typical connections between audio lines, patch bays, and rack mounted equipment.
 - v. Drawings of any custom items in a scale suitable for fabrication. The drawings must detail materials, colors, finishes, and any lettering or other markings. All lettering must be shown in the size and typeface to be used. These drawings include custom plates, rack panels, termination plates and any other custom manufactured equipment.
 - vi. All custom panels in the direct view of the general public may require a custom finish. Provide a list of all panels in the direct view of the general public and their location so that the architect may respond with any custom finish requirements. The Architect may request samples of each custom finish required. The Contractor must provide these samples to the Architect upon request, for approval. Costs for the samples and shipping the samples to the Architect shall be the sole responsibility of the Contractor. Submitted samples will not be returned.
 - vii. Rack elevation drawings indicating equipment locations within the rack, power distribution and any cabling routing information. Elevate the front and rear of all racks. Notate any equipment in the rack that must have a security cover, per the rack specifications below.

- viii. Patchbay layout drawings at 1:1 scale showing labeling and indicating any normal connections and the type of normal connection.
 - ix. Mechanical drawings showing mounting and/or rigging of all permanently installed AV Systems equipment, including but not limited to projectors, projection screens, displays, loudspeakers, cameras, and other AV devices that mount to architecture or structure. Additionally provide drawings for any permanently installed mounting plates designed to support portable AV systems equipment. All mounting systems must be a fully engineered solution, must be approved in concept by the Systems Designer, and each drawing sheet must be stamped by a licensed structural engineer selected by the Contractor. Each custom solution must be shown separately and verified and stamped independently.
- f. AV Network Submittal: Within 75 days of award the Systems Contractor must provide the following in a single PDF format document:
 - i. In coordination with the Owner's IT department, provide a networking plan for the AV systems networks. This plan must include:
 - a) Narrative description of the network design and function including but not limited to information describing all LAN's, VLAN's, and QOS plan.
 - b) Physical network diagram
 - c) Logical network diagram
 - d) IP Address table and addressing protocol, including fixed IP addresses for all AV systems devices. This document must be updated for the as-built submittals to indicate the corresponding MAC address for each device.
 - ii. Provide a written plan for EDID and HDCP management for all video signals and interconnection between devices.
- g. User Interface GUI Submittal: Within 90 days of award the Systems Contractor must provide the following in a single PDF format document:
 - i. A mockup of all graphical user interface screens for touch panels, computer displays, portable devices and any other display format, including but not limited to all loudspeaker control software, Digital Signal Processing software, Video routing and switching software, and control systems software.
 - ii. Source code and configuration files for any and all devices, as required for proper systems operation.
- h. Bi-weekly Progress Report Submittals: Every two weeks after award, the Systems Contractor must provide a progress report that includes:
 - i. Overall status of the project and work completed by percentage
 - ii. Schedule changes

- iii. Detailed Three-week work plan
- iv. Procurement updates:
 - a) Procurement problems
 - b) Concerns needed to be addressed by others
 - c) Value of materials procured and stored on site, or if allowed, in the Systems Contractor facility as a dollar value and a percentage of total project materials cost.
- v. List of outstanding submittals indicating document number and date of submittal, in order from most recent to first submittal.
- vi. List of outstanding RFI's indicating document number and date of submittal, in order from most recent to first submittal.
- vii. Indicate any items in v. and vi. above that are overdue and whether or not they are affecting schedule. If they are affecting schedule provide information as to why and how they are affecting schedule.
- i. Equipment Purchase Authorization Submittal: 30 days prior to any equipment purchase the Systems Contractor must request line-item authorization from the Systems Designer to purchase equipment. This is to avoid procurement of equipment that may already be outdated by the time of procurement. The Systems Designer shall respond to the Systems Contractor within 15 days of receipt of the procurement request with approvals and/or replacement products. There will be no allowance for schedule extension based on this requirement.
- j. AV System Test Report and Written Statement of Completion Submittal: At completion of installation and Systems Contractor testing (see 3.10, 3.11, and 3.12 for testing requirements), the Systems Contractor must provide the following in a single PDF format document:
 - i. Written Statement of Completion that verifies the installation is 100% complete and has been tested as required, and is ready for the Systems Designer to perform testing and commissioning of the systems.
 - ii. A Testing Report that includes:
 - a) ALL test data from all tests, including failed tests and subsequent passing tests after rectifying the problem that caused failure. Test data should include Flunke printouts for data and fiber tests and should show pass/fail status of every individual parameter being tested as part of the cable verification process.
 - b) Usage of any spare cabling to replace cabling that was damaged during installation. Include the wire numbers of the failed cable and the spare used to replace it.
 - c) A listing of any and all portable equipment, cabling, racks, etc. that is not located on site, a reason for that, and a date as to when it is expected on site.

- k. AV As-Built and O&M Manual Submittal: Within 30 days of completion of Systems Designer testing and commissioning, Owner training, delivery of any missing equipment, and resolution of any and all punch items including software programming changes, the Systems Contractor must provide the following on five separate USB storage devices (three to the Owner, and two to the Systems Designer):
 - i. Systems Documentation:
 - a) Table of contents
 - b) Written Guarantee and service policy
 - c) Copies of all shop drawings which have been updated to include any changes made during the installation process.
 - d) Single-line signal diagrams identifying all cable runs and patchbay points with the associated cable number
 - e) Complete Systems Contractor Testing report
 - f) Complete and updated conduit riser diagram to match installed conduit.
 - g) Final system settings for all settings adjusted during Systems Designer testing and commissioning
 - h) Updated network documentation as listed above
 - i) All updated and current system software files, source code, GUI designs, and any other software files for all of the AV Systems
 - j) All available manufacturers' operation and service literature for each major system and system component.
 - k) Systems operational procedures including power on sequences, power off sequences, recovery from power failure sequences, emergency procedures, and any other procedures needed to operate the systems properly in any and all states.
 - l) In addition to the above, provide to the Owner, two printed copies of items j) and k) above.
 - m) In addition to the above, provide to the Owner one laminated copy of each sheet of each Single-Line signal diagram for each venue as per item d) above.

1.6 QUALITY ASSURANCE

- A. All parts shall be provided complete per manufacturer's specifications and with all necessary accessories required to meet the intent of the design and provide fully functional systems, including but not limited to any mounting devices, software licenses, SFP modules, etc.
- B. All materials shall be new and shall meet or exceed all applicable requirements and standards of Underwriters Laboratories and the American Standards Association.
- C. Systems Contractor is responsible for obtaining and paying for all permits, licenses and inspections, for meeting any requirements of permits and licenses, and for

remediating any work called out as incorrect or not meeting code or other standards during inspections.

- D. Systems Contractor must act in accordance with applicable federal, state, local, and union labor regulations.
- E. Installation shall conform to latest federal, state and local electrical and safety codes or those of other authorities having jurisdiction (AHJ). Where conflicts exist, the most stringent code or regulation shall apply.
- F. If additional work by the Systems Designer is required as a direct result of deviations from approved drawings and specifications during construction, the Contractor will be liable for those additional costs that the Owner may incur.
- G. Government Standards: The Systems Contractor is to comply with all government regulations, standards, and laws that apply to the installation and use of the AV equipment and/or other scope of work specified in this section. The following agencies have laws and rules that apply:
 - 1. Federal Communications Commission (FCC): FCC rules are located in Title 47 of the Code of Federal Regulations. The following is a partial list of the FCC regulations that apply to equipment specified in this section of work:
 - a. Part 15: Radio frequency devices
 - b. Part 22: Public mobile services.
 - c. Part 24: Personal communications services.
 - d. Part 25: Satellite communications.
 - e. Part 27: Wireless communications service.
 - f. Part 51: Interconnection.
 - g. Part 74: Experimental radio, special broadcast, and other program distribution services.
 - h. Part 95: Personal radio services.
 - 2. Occupational Safety and Health Administration (OSHA) – Follow all applicable standards for health and safety particularly sound pressure level exposure.
 - 3. ANSI Standards: American National Standards Institute (ANSI) standards cover safety, fabrication, assembly, installation, rigging, equipment handling, and testing.
 - 4. Contributing Organizations – The Organizations listed below have published standards used to establish the technical references to be followed under this scope of work.
 - a. Acoustical Society of America (ASA) (ASC S1)
 - b. Alliance for Telecommunications Industry (ATIS) (ASC T1)
 - c. American Society of Safety Engineers (ASSE) (ASC A1264)
 - d. Audio Engineering Society (AES) (ASC S4)
 - e. Electronics Industry Alliance (EIA) (CEMA)
 - f. Entertainment Services and Technology Association (ESTA) (ASC E1)
 - g. Institute of Electrical and Electronics Engineers (IEEE) (ASC C136) (802.1)
 - h. International Cable Engineers Association (ICEA) Formerly IPCEA
 - i. International Standards Organization (ISO)
 - j. National Electrical Manufacturer's Association (NEMA) (ASC C119)
 - k. National Fire Protection Associations (NFPA)

- l. National Safety Council (NSC) (ASC A10)
 - m. Photographic and Imaging Manufacturer's Association (PIMA)
 - n. Society of Motion Picture and Television Engineers (SMPTE)
 - o. Telecommunications Industry Association (TIA)
 - p. Underwriters Laboratories (UL) (ASC C101) (CE)
 - q. NTSC
 - r. BICSI
 - s. National Association of Broadcasters (NAB) – System technical standards for video and RF compliance are listed in the most recent edition of the NAB Handbook
5. Safety Standards – Contractor will adhere to the following Safety Standards for all work identified in Division 27 41 00 and as part of the General and Supplementary sections of the Division-1 Specifications.
- a. ANSI A14.2-2000: Safety Requirements for Portable Metal Ladders
 - b. ANSI A14.7-2000: Safety Requirements for Mobile Ladder Stands and Mobile Work Platforms.
 - c. ANSI C2-2002: National Electrical Safety Code
 - d. ANSI Z136.1-2000: Safe Use of Lasers and laser systems
 - e. ANSI Z136.2-1997: Safe Use of Optical Fiber
 - f. ANSI Z359.1-1992 (R1999): Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components.
 - g. ANSI/PIMA IT7.101-1999: Recommended Practice for the Safe Handling and Operating of Audiovisual Equipment.
 - h. IEEE 142-1991: Grounding of Industrial and Commercial Power Systems
 - i. UL 514A: Scrub Water exclusion from AV Floor Boxes
 - j. UL 1419-1995: Standard for Safety for Professional Video and Audio Equipment
 - k. in accordance with the National Electrical Code, ANSI/NFPA 70
 - l. UL 1492-1994: Standard for Safety for Audio-Video Products and Accessories
 - m. UL 1651-1997: Standard for Safety for single and multiple Optical Fiber Cable
 - n. UL 1667-1996: Audiovisual Systems Safety Standard for Tall AV Institutional Carts for use with Audio, Video, etc.
 - o. ANSI E1.1-1999: Construction and Use of Wire Rope Ladders to prevent most injuries
 - p. ANSI A10.8-2001: Safety Requirements for Scaffolding
 - q. ANSI A10.42-2000: Rigging Qualifications and Responsibilities
6. Applicable Performance Standards – Execute all Division work in accordance with the following standards:
- a. ANSI S4.48-1992 (R1998): Recommended Practice for the Application of Connectors, Part 1, XLR-Type polarity, and gender
 - b. ANSI S4.55-1997: Recommended Practice for conservation of the Polarity of Audio Signals
 - c. ANSI S4.56-1997: Recommended Practice for the subjective evaluation of Loudspeakers
 - d. ANSI S12.2-1995 (R1999): Criteria for Evaluating Room Noise
 - e. ANSI T1.217-1991 (R1998): Integrated Services Digital Network (ISDN)

- f. Management –Primary Rate Physical Layer
- g. ANSI T1.522-2000: Quality of Service (QOS) for Business Multimedia Conferencing. Specifies classes of Service for conferencing on IP Networks
- h. AES15: ANSI S4.49: AES Recommended practice for Sound Reinforcement Systems –Communications Interface PA-422.
- i. AES-R1-1997 AES project report for professional audio: Specifications for audio on high-capacity media
- j. AES14-1992 (r1998) AES standard for professional audio equipment -- Application of connectors, part 1, XLR-type polarity and gender
- k. AES24-1-1999, (Revision of AES24-1-1995) AES standard for sound system control - Application protocol for controlling and monitoring audio devices via digital data networks
- l. AES26-2001 (Revision of AES26-1995) AES recommended practice for professional audio -- Conservation of the polarity of audio signals
- m. ANSI/TIA/EIA 606-1993: Standard for the Telecommunications Infrastructure of Commercial Buildings
- n. ANSI/TIA/EIA 607-1994: Commercial Building Grounding and Bonding Requirements for Telecommunications
- o. IEEE 149-1979 (R1990): Test Procedure for Antennas
- p. IEEE 1100-1999: Powering and Grounding Sensitive Electronic Equipment
- q. NEMA 250-2001: Enclosures for Electrical Equipment
- r. SMPTE 292M: SMPTE 292M defines the base 1.485Gbps HD-SDI. Note: This standard can handle all HD formats except 1920*1080 @ 50P and 60P.
- s. SMPTE 372M: Uncompressed Dual-Link HD-SDI for 50P & 60P
- t. SMPTE 424M: 2.97 Gbps HD-SDI for 50P & 60P
- u. TIA/EIA-568-B: Digital audio over Cat5 audio cable
- v. UL 1047-1999: Isolated Power Systems Equipment
- w. UL 1581-1998: Reference Standard for Electrical Wires, Cables, and Flexible Cords
- x. UL 1682-1998: Standard for Safety for Plugs, Receptacles, and Cable Connectors, of the Pin and Sleeve Type up to 800 Amperes and up to 600 volts ac or dc.
- y. UL 467-1998: Grounding and Bonding Equipment
- z. UL 813-1999: Commercial Audio Equipment and accessories for use in commercial enterprises
- aa. ANSI/TIA/EIA-568-A: Commercial Building Telecommunications Cabling
- bb. ANSI/TIA/EIA-569-A: Commercial Building Standard for Telecommunications Pathways and Spaces
- cc. ANSI/TIA/EIA-607: Commercial Building Grounding and Bonding Requirements for Telecommunications
- dd. ANSI/TIA/EIA TSB-72: Centralized Optical Fiber Cabling Guidelines
- ee. ANSI/TIA/EIA-526-14A: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant

- ff. ANSI/TIA/EIA-526-7 Measurement of Optical Power Loss of Installed Single mode Fiber Cable Plant
- gg. ANSI/IEEE C-2 National Electrical Safety Code how to install cabling in accordance with the most recent edition of BICSI® publications:
 - i. BICSI Telecommunications Distribution Methods Manual
 - ii. BICSI Cabling Installation Manual

1.7 WARRANTY AND WARRANTY SERVICE REQUIREMENTS

- A. All systems devices shall be guaranteed free of defects in materials and workmanship for a minimum period of one year and for a maximum period not to exceed the length of the manufacturer's warranty. All workmanship will be guaranteed free of defects for a period of one year. These warranty times begin on the date the Systems Designer accepts the systems as complete.
- B. The Systems Contractor will provide the Owner with an emergency service request phone number that will be answered business hours, every business day excepting major holidays. See response times below.
- C. In a non-emergency situation, defective devices shall be repaired or replaced within three business days following the report of such defects by the owner, and telephone calls must be responded to within one business day.
- D. Many of the systems installed as part of this scope of work are critical to the operation of the facility. As such it is mandatory that the following replacement and response times be strictly adhered to in a Qualifying Emergency Event. Qualifying emergency events are defined as events that may cause severe hardship or cause the systems to be inoperable or unusable for a scheduled class or event. In an emergency event:
 - 1. The Systems Contractor must respond to telephone calls within one hour during business hours. The personnel answering this call must be fully qualified to troubleshoot problems and propose solutions.
 - 2. If the situation requires a site visit, The Systems Contractor must have personnel on-site within one business day of the phone call determining the need.
 - 3. If corrective measures on-site are required, they will be performed within one business day of the determination of a need for a site visit.
- E. If, during the warranty period, any component is out of service for more than seven days due to unavailability of parts or service, Contractor shall supply and install an identical new component. If an identical component is not available, Contractor will substitute equivalent equipment, with the approval of the Owner.
- F. Repeated device failures, defined as the failure of a device or a single type of device three or more times over three contiguous months, will be considered as a failure of a manufactured system and all items of this type shall be replaced at no charge to the Owner.
- G. During the course of the warranty period, the Contractor shall provide a minimum of three (3) service visits to the site for inspection and adjustment of equipment. Contractor shall submit proposed schedule for these visits and shall notify Owner and Systems Designer in writing at least one month in advance of each visit.

- H. During the warranty period, the Systems Contractor will supply the Owner with any published updates of manufacturer provided operating software and firmware for any and all software-controlled equipment that are issued to correct “bugs”. During the warranty period, the Owner will rely on the Systems Contractor to determine when to update the software and/or firmware, unless it is needed to correct a situation that renders the systems unstable, non-functional, or otherwise affects operations.
- I. At least one representative of the Systems Contractor, well versed in the installation and the operation of the systems, shall be on site in support of the Owner for the first significant event in the venue (as determined by the Owner) where the system will be used. The Contractor representative(s) for this event shall also be competent in all operations.
- J. The Contractor is to coordinate ongoing remote access to AV Systems Networks for support and troubleshooting. Owner to provide the access at their discretion.

1.8 PERMIT

- A. Obtain all permits necessary for the execution of any work pertaining to the installation and conform in all trades with all applicable codes/regulations. Obtain all permits necessary for operation of any equipment by the Owner, including but not limited to laser projectors and radio systems.

1.9 INSURANCE

- A. All equipment and materials shall be fully insured, by the Systems Contractor, against loss or damage up until acceptance of the system by the Owner or until Owner relieves the Contractor in writing of this responsibility, whichever is earlier, regardless of the location of the equipment. All equipment is deemed to be under the control of the Systems Contractor until acceptance of the system by the Owner or until Owner relieves the Contractor in writing of this responsibility, whichever is earlier.

1.10 EXISTING CONDITIONS

- A. For projects including renovation work on existing facilities, visit the site prior to making a bid. No subsequent allowance will be made due to failure to thus observe and verify conditions which may affect the work. Report to the Architect and Systems Designer any discrepancies among this specification and existing conditions and similarly report obvious omissions.

1.11 DIVISION OF RESPONSIBILITY TABLE

ITEMS PROVIDED AND INSTALLED	Electrical Contractor Provide	Electrical Contractor Install	Systems Contractor Provide	Systems Contractor Install
Main Power Panel Boards and Circuit Breakers	X	X		
Audio Video Isolated Ground Power (AVIGP) Transformers	X	X		
AVIGP Isolated Ground Conduit, and Conductors	X	X ¹		
AVIGP panel boards and circuit breakers	X	X		
AVIGP standard load centers and circuit breakers	X	X		
AVIGP Company Switches	X	X		
Audio Video Systems Equipment Racks, Termination Panels, and Audio Video Devices				
- Racks			X	X
- Termination Panels			X	X
- Termination Panel Back Boxes		X ¹	X	
- Termination Panel Floor Boxes		X ¹	X	
- All conduit, J-Boxes, Cable Sleeves, Ladder Tray, Mounting Hardware for Audio Video Systems Signal and Control Cabling	X	X ¹		
- Conduit Isolation Bushings at Racks	X	X		
- Audio Video Cabling			X	X
- Audio Video Cabling Termination			X	X
AVIGP Branch Circuits for Systems Equipment Racks going to:				
- In Wall Outlets	X	X		
- Ladder Tray Mounted Outlets	X	X		
- Ceiling Mounted Outlets	X	X		
- In Rack Power Distribution Devices		X ²	X ²	
Audio Video Systems Conduit Riser Diagram Submittal	X ³			

Note 1: Installation criteria and coordination provided by Systems Contractor

Note 2: Rack Power Raceways are provided and installed by the Systems Contractor. The branch circuits are installed and terminated to the raceway by the Electrical Contractor. Care must be taken to maintain the isolation of the rack and its contents from building ground.

Note 3: The Conduit Riser Diagram is developed by the Electrical Contractor with criteria provided by the Systems Contractor. This is a critical submittal. Any conduit installed prior to approval is at risk and any replacement, remediation, or repairs required to meet specifications will be performed at the Contractor's cost.

PART 2 - EQUIPMENT

2.1 GENERAL EQUIPMENT

- A. All equipment specified by manufacturer and model number is done so for the purposes of establishing a standard of quality, performance, construction and function.
- B. All materials and equipment shall be of the latest design or model offered for sale by the manufacturer.
- C. All equipment will be new and be supplied with a full manufacturer's warranty.
- D. The equipment provided shall operate at the required AC line voltage and frequency for the available power supply.
- E. Contractor shall provide quantities as indicated in the specifications, specification appendices, and in the large format AV drawings. Where quantities appear to differ, the Contractor must request clarification from the Systems Designer.
- F. Audio & Video Wire and Cable
 - 1. All wire numbers listed in the drawings are Windy City unless otherwise noted.
 - 2. THHN wire is not an allowable substitute for twisted pair stranded loudspeaker wiring.
 - 3. Approved manufacturers: Belden, Canare, Gepco, West Penn, Whirlwind, Windy City.
 - 4. Where conflict exists with any codes or ordinances, such codes and ordinances shall take precedence.
 - 5. Where conflict exists with electrical specifications, the higher standard or more stringent requirement shall apply, at the discretion of the Systems Designer or AHJ.
- G. AV System Plates and Panels:
 - 1. Rack Mount Panels shall be constructed of 11-gauge steel or 1/8" Aluminum, minimum thickness. Finish shall be black or match adjacent equipment. The panels shall be 19" wide with standard EIA mounting hole spacing. Height as specified.
 - 2. Back Box Enclosures shall be code grade steel. Black, Galvanized, or Stainless Steel (for NEMA4 or 4X). Size as specified.
 - 3. Plug Box and Termination Panels shall be constructed of 11-gauge steel or 1/8" Aluminum, minimum thickness. Finish shall be black (unless instructed otherwise by Architect – see 1.5.C.3.e.iv. Size as specified. Approved Manufacturers: Steel City, Raco, Hoffman, Whirlwind, Pro Co, Wireworks
 - 4. Engraved lettering is white paint filled engraving on black anodized panel unless it is a custom color panel in which case, confirm lettering color with Systems Designer. Lettering is to be upper case, 14 point, Arial. Where spacing is critical, reduction to 12 point is allowed.

2.2 MAJOR EQUIPMENT

- A. Equipment provided shall be that specified herein or approved substitute (see Paragraph 1.5.C.3.b).

- B. Detailed performance specifications shall be those published by the manufacturer effective on the date of this document for all equipment listed.
- C. See Major Equipment List in Appendix B.

2.3 DETAIL DRAWINGS

- A. The drawings herein may detail custom built equipment and system details.
- B. Furnish all materials and labor to provide complete and finished work even though not specifically shown on the drawings.
- C. Detail drawings are located in large format AV drawings.

PART 3 - EXECUTION

3.1 AUDIO VIDEO SYSTEM REQUIREMENTS

- A. Requirements herein refer to materials and work which are related to or part of the Systems. Where conflict exists with other specifications concerning such work or materials, this specification takes precedence unless otherwise approved in writing by the Architect.

3.2 AUDIO VIDEO SYSTEMS INSTALLATION

- A. All equipment must be installed in such a manner and in locations that allow for access for maintenance and repair. Equipment racks must be placed in the rack rooms to permit full access for operation and service.
- B. Furnish and install all necessary brackets, braces and supports. All mounting hardware shall be included. AV devices may require additional support and/or backing in stud walls or ceilings to support the weight of the device. Contractor must furnish and install all support and backing as necessary for proper and safe installation.
- C. All bolts and fasteners must be Grade 5 or better.
- D. All bolted attachments to have lock washers or other self-locking fasteners.
- E. Provide all required mounting brackets and framing, hardware and components, safety systems and rigging systems using the following minimum design factors (given as ratio of working load limit (WWL) : rated breaking load):
 - 1. 5:1 – Minimum design factor for all mounting components regardless of mounting condition.
 - 2. 8:1 – Minimum design factor for all hardware and connecting assemblies between manufacturer rated assemblies when equipment is not hung above the general public.
 - 3. 10:1 – For all hardware and connecting assemblies between manufacturer rated assemblies and supporting structure when equipment is hung above the general public and for all single point rigging suspension.
 - 4. Design factor calculations to be provided with all equipment mounting details.

- 5. Systems Contractor shall coordinate required additional blocking, supplemental steel or channel strut supports with Main Contractor & specific trade contractors.
- 6. All mounting systems not provided as a complete package from a single manufacturer must be engineered, approved, and have drawings stamped by a professional rigging engineer or licensed structural engineer, as approved by the Main Contractor. The engineer shall verify that the design meets or exceeds design criteria for this particular use case. Each mounting system solution must be separately engineered, verified, and stamped.
- F. All supporting structures and enclosures supplied by the Contractor not having a standard factory paint finish shall be painted. Paint specifications will be supplied by the Architect or indicated herein.
- G. Provide custom color or finish for any panels, or materials supplied which are in public view and for any equipment where specified. Request information on color and finish from the Architect.
- H. Finish of blank panels and custom assembly panels shall match adjacent equipment panels. All color choices should be clearly indicated on panel drawing submittals, and on the panel schedule submittals
- I. Switches, connectors, jacks, receptacles, outlets, cables and cable terminations shall be logically and permanently marked. Custom panel nomenclature shall be engraved, etched or screened. Markings for these items are detailed in the drawings to ensure consistency and clarity. Verify any changes in working type size and/or placement with the Systems Designer prior to marking.
- J. Protect equipment and related wiring where construction conditions may cause damage or environmental conditions exceed manufacturer's specifications.

3.3 CONDUIT

- A. Review and coordinate Systems conduit installation with the electrical contractor to ensure proper operation of the Systems. Provide input to the electrical contractor so that they may complete the AV conduit riser submittal.
- B. All wiring shall be in conduit unless authorized by the Architect, approved by the Systems Designer, and permitted by code. Exceptions are short runs at rack terminations where there is no means of connecting conduit to the equipment.
- C. Where installed exposed, conduits shall be parallel with or at right angles to walls or ceilings and shall be supported from walls or ceilings by means of approved galvanized iron clamps or hangers. Conduit connections to equipment racks shall be insulated to maintain ground isolation.
- D. Minimum size conduit shall be 3/4 inch. All conduit shall be sized for a maximum 40% fill, unless applicable codes require a lower maximum fill
- E. No conduit run between pull boxes/termination boxes may exceed 100 feet in length, and no single turn may exceed 90 degrees.
- F. No conduit run shall have more than 180 degrees of combined turns between pull boxes.

- G. Conduit containing STP, UTP, and COAX wire types must be installed so that the final length of the cable runs does not exceed maximum cable lengths as stated in 3.7.N and 3.7.O.
- H. Systems wiring is divided into wiring groups according to their nominal voltage levels. Cabling may be combined in a single conduit, and/or junction box(es) as long as all cables are of the same wiring group. Refer to the Major AV Drawings General Information sheet for information on conduit separations by cable type. Refer to major AV drawings Terminations Schedule for cabling, grouping, and destination details, by termination):
- I. All conduits, within 6" of termination box, junction box, gutter or rack/ ladder tray, must be labeled with conduit group and destination of the opposite end of that conduit, as follows: "AV -<Group>- <opposite end>". For example "AV – III – STGA-01". Permanent marker on the conduit where it can be seen from the ground or nearest access point is acceptable.
- J. Each termination does not require individual home run conduits. Conduits of like groups may be combined at junction boxes so that a smaller number of larger conduit sizes may be used instead of a larger quantity of smaller individual conduits.
- K. Contractor must have written authorization from the Systems Designer for any conduit installation which does not conform to these requirements. The conduit separations above are based on the use of EMT conduit for all AV and other signals. Separations where Rigid conduit is utilized for AV systems and/or other adjacent systems may be halved. Separations where PVC conduit is utilized for AV systems and/or other adjacent systems must be doubled. Flex conduit is not allowed without written authorization for each separate instance. The Contractor must request information on separation adjustments for each instance where a different type of conduit than what is listed above is used.

3.4 ELECTRICAL POWER

- A. Review and coordinate electrical power system installation including grounding with the electrical contractor to ensure proper operation of the Systems.
- B. Verify that all AC power circuits designated for Systems equipment are wired with correct polarity and isolated ground. Report in writing any discrepancies found to the Architect for corrective action.
- C. Provide distribution of electrical power within the equipment racks with a minimum of one spare AC receptacle for each four in use per branch circuit.
- D. All AV systems electrical power distribution and outlets are provided and installed per the Division of Responsibility Table (see 1.11)
- E. DIV. 26 contractor is to provide engraved cover plates for all power receptacles used in the Audio Video Systems, both isolated ground, and standard circuits that are shown as provided by Electrical Contractor. The engraving must call out the panel number and the circuit number(s) for the circuit(s) connected to that particular receptacle.

3.5 STEEL SUPPORTS

- A. Fabricate and install any supports so that the installation does not weaken or overload the building structure. Do not impose the weight of equipment or fixtures on supports provided for other trades or systems. No drilling or cutting of concrete beams, joists, or structural steel, nor welding to structural steel, will be permitted except as authorized, in writing, by the Architect.

3.6 BOXES

- A. With the exception of portable equipment, all boxes, conduits, cabinets, equipment and related wiring shall be held in place and the mounting shall be plumb and square.
- B. All boxes shall be securely mounted to building structure. All boxes shall be installed so that wiring contained in them is accessible. Install blanking devices or threaded plugs in all unused holes.
- C. Wiring groups and circuits shall be isolated as indicated herein. Common pull or junction boxes are not permitted except as authorized, in writing, by the Systems Designer.
- D. Clean all box interiors before installing plates, panels or covers.
- E. Using permanent marker on the box or on wire tags, indicate the lengths of installed cable for all COAX and Category wiring inside the box.
- F. Using permanent marker, inside the box, indicate the box name, for example "STGA".
- G. Ensure that all floor boxes can open and close without impediment from attached portable cabling or surrounding building elements such as audience seating.
- H. Coordinate floor box, panel, and cover location and orientation with Electrical Contractor and Systems Designer prior to installation.

3.7 WIRING METHODS AND PRACTICES

- A. Provide installation of all Systems wire and cable, ensuring proper:
 - 1. Pulling Tensions
 - 2. Quantities
 - 3. Types
 - 4. Lengths
 - 5. Routing
 - 6. Wire Group Separation
 - 7. Identification
- B. The interconnection of equipment in a rack shall use the same wire by type as specified for runs external to racks unless otherwise indicated on AV single line drawings. All wiring within racks shall be direct between devices without splices.
- C. Interconnection wire between amplifiers and loudspeaker transition panels will be type SP12 (refer to wire types on AV000)
- D. Connector polarity shall be maintained except for terminations at equipment manufactured to other standards. If manufactured equipment can be ordered with, or internally set to, various standards, the equipment shall be configured as follows:

1. Polarity for XLR style connector shall be: pin 2-high, pin 3-low, and pin 1-shield.
 2. Polarity for TRS style connector shall be: tip-high, ring-low, and sleeve-shield.
- E. Spare wire runs of each group and type shall be pulled to each termination location. The number of spares shall be ten percent of those in actual use or one, whichever is greater.
- F. Splicing of cables is not permitted between terminations of specified equipment.
- G. Do not pull wire or cable through any box fitting or enclosure where change of raceway alignment or direction occurs without written approval from the Systems Designer; do not bend conductors to less than recommended radius. Employ temporary guides, sheaves, and rollers to protect cables from excess tension, abrasion or damaging bending during installation.
- H. Provide wire pulling lubricants and pulling tensions in accordance with the wire and cable manufacturer's recommendations.
- I. All wires shall be permanently identified at each wire end by marking with self-laminating adhesive labels fully covered with clear heat shrink tubing, and a chart kept of each wire's function. This applies to wire within a rack assembly as well as wire running in conduit.
- J. Wire ends should be wrapped with heat shrink tubing. Each shield or drain wire should be covered with heat shrink to avoid unintentional connections.
- K. Use Wago or Entrelec DIN rail mounted terminal blocks for all terminal block wiring connections. Do not exceed one wire per terminal connection point. Do not cut strands from conductors to fit lugs or terminals. Spare terminal blocks, equivalent to 10% of those in actual use, shall be provided.
- L. Form, in an orderly manner, all conductors in enclosures and boxes, wire ways and wiring troughs, providing circuit and conductor identification. Tie using wraps of appropriate size and type. Limit spacing between ties to six (6) inches and provide circuit and conductor identification at least once in each enclosure.
- M. Provide service loops, minimum 6', at each termination so that plates, panels, patch bays, and equipment can be dismantled and placed on an adjacent horizontal work surface allowing for safe service and inspection without disconnection.
- N. Maximum installed length of Category cables is 200'
- O. Maximum installed length of Coaxial cable for HD-SDI, 3G-SDI, 6G-SDI, and 12G-SDI is 200'

3.8 GROUNDING

- A. Audio system wiring shall conform to the following procedures:
1. Audio equipment AC ground pins shall connect to AC isolated ground.
 2. Audio equipment chassis shall connect to AC isolated ground or rack frames.
 3. Audio rack frames shall connect to AC isolated ground bus in panelboard by means of #2 gauge (minimum) conductor.

4. Audio shields between AC powered pieces of equipment, where signal shield is tied to chassis ground, shall be directly connected to ground at the initiating end only. Capacitively terminate the receiving end with a 0.1 μ F capacitor.
 5. Audio signal paths between AC powered pieces of equipment shall be connected using balanced lines and/or transformer isolation as required. No unbalanced signal paths may be connected to the patch bay.
 6. Isolate all Systems wiring from racks, back boxes and conduit.
 7. Isolate all Systems racks from conduit and other conductive surfaces. Use insulated bushings for conduit connections and a dielectric plinth between racks and conductive flooring materials.
 8. AC isolated ground system shall be isolated from all other facility grounds except at the single point of connection at the AV isolation Transformer.
 9. All metallic conduit, boxes and enclosures shall be grounded in accordance with the current National Electrical Code.
- B. Metallic enclosures containing active equipment shall be grounded with due regard for the minimization of electrical noise. This may include the provision of grounding conductors separate from the AC ground.

3.9 EQUIPMENT RACKS

- A. The equipment racks shall be considered as custom assemblies and shall be assembled, wired and tested in the Contractor's shop. Assembly of racks on-site will not be permitted, without written approval from the Systems Designer (except for system wiring which must terminate directly to the patch bays via soldering, punch-down or other non-connectorized termination process).
- B. Placement of equipment in equipment racks, as shown in the drawings, is for maximum operator convenience. Verify any changes in placement of the equipment with the Systems Designer before assembly.
- C. All primary equipment racks shall contain at the top of the rack a single rack-unit rack panel containing both the contractor and consultant's contact information.
- D. Racks shall be installed plumb and square without twists in the frames or variations in level between adjacent racks.
- E. All wire, cable, terminal blocks, rack mounted equipment, and active slots of card frame systems shall be clearly and logically labeled as to their function, circuit, or system. Labeling on manufactured equipment shall be by engraved plastic laminate or by thermal printer on adhesive tape, with white lettering on black background or dark background that is similar to panel finish.
- F. Provide stiffeners to custom panels to prevent panel deformation during normal plugging or switching operations.
- G. All wires and cables used in assembling custom panels and equipment racks shall be formed into harnesses which are tied and supported in accordance with accepted engineering practice.
- H. Harnessed cables shall be combed straight, wrapped every six (6) to ten (10) inches, and attached to the structure as necessary. Each cable that breaks out from a harness for termination shall be provided with an ample service loop so that panels, patch bays, and equipment can be dismounted and placed on an adjacent

horizontal work surface allowing for safe service and inspection without disconnecting.

- I. Harnessed cables shall be formed in either a vertical or a horizontal relationship to equipment, controls, components or terminations.
- J. All system components and related wiring shall be located with due regard for the minimization of induced electro-magnetic and electrostatic noise, for the minimization of wiring length, for proper ventilation, and to provide reasonable safety and convenience for the operator.
- K. All rack mounted equipment, with front panel controls, shall be provided with security covers to avoid tampering with preset levels. If specific security covers are not included in the equipment list, the Contractor will provide the manufacturer's security cover for each specified device or a suitable alternate.
- L. All rack-mounted network switches shall be provided with rear-facing ports (if available) or else mounted to the rear rack rails of the equipment rack to avoid accidental unpatching.
- M. Every device shall be installed with regard for proper polarity. Absolute polarity shall be maintained through the entire Systems signal chain.
- N. Any permanently mounted electronic device must be balanced. Contractor will provide balancing transformers for unbalanced equipment connections where necessary.

3.10 SYSTEMS CONTRACTOR TESTS

- A. The Systems Contractor must test all the systems and systems components, as described below, prior to Systems Designer Testing and Commissioning. At the conclusion of the Systems Contractor Testing, the Systems Contractor will submit a Written Statement of Completion and test reports indicating test results, including failed tests and re-tests to clear the failures. Test reports shall individually reference every criteria mentioned below.
- B. Test each point-to-point wire segment individually, and test any linkage of multiple point to point cables that form an end to end link.
- C. Provide wireless frequency coordination reports, to include any existing wireless equipment and results of any on-site frequency scans.
- D. Contractor must document all test requirements and results for submission (see 3.12 below).
- E. Confirm that each individual wire and cable run (whether in a rack or in conduit) is identified with a unique number. These numbers are affixed to both ends of each cable and are clearly visible. Provide a complete list of these numbers along with the termination location of each end of the wire run.
- F. Verify all circuits and extensions for correct connection, continuity and polarity. Absolute polarity must be maintained between all points in the system.
- G. Identify installed length of all copper and fiber cabling.
- H. Confirm that all system outputs are free of spurious signals including oscillations and radio frequency signals. A wide band oscilloscope shall be used to verify this condition.

- I. Confirm that the system is free of audible clicks, pops, and other noises when any operating control is activated, with or without input signal.
- J. For MIC, LINE, ACOM, SP48(signal pair), CTRL, AND MIDI cable types, confirm:
 - 1. Proper circuits appearing at each termination location
 - 2. Proper circuits appearing at each jack bay position
 - 3. Continuity of all conductors
 - 4. Proper polarity is maintained
 - 5. Absence of shorts between conductors within each circuit
 - 6. Absence of shorts between circuit conductors and conduit
 - 7. Perform a sweep test to 0.5MHz
- K. For ANTS, and ANTL cabling confirm:
 - 1. Verify that TDR impedance is 50 +/-3 ohms
 - 2. Frequency sweep test from 5MHz to 1000MHz.
- L. For VIDSDI cabling confirm:
 - 1. Verify that the installed cable meets, at a minimum, the requirements set forth in SMPTE ST 2081 for 6G-SDI single-link and 12G-SDI dual-link.
 - 2. Verify that TDR impedance is 75 +/-3 ohms
 - 3. Frequency sweep test from 5MHz to 6GHz.
- M. For STP and UTP cabling:
 - 1. Use Category 6A cable pair tester to verify compliance with TIA/EIA standards referenced above (including all current addendums)
 - 2. Test each cable using the permanent link procedure for opens, shorts, reversals, cross twists and mis-wiring. Check NEXT, ELFEXT, Delay Skew, Return Loss, and Alien Crosstalk.
 - 3. Report all mis-wiring or failures found and report retests as needed.
 - 4. If any conductors report open or short, replace the entire wire and re-test.
 - 5. Submit TIA/EIA test reports generated by the test device.
- N. For OS2 and OM4 Fiber cabling:
 - 1. Using appropriate test devices and proper factory terminated jumpers, measure all fiber optic line attenuations, end to end, as required by TIA/EIA-526-14A.
 - 2. Optical budget may not exceed the cable performance by length plus splice and connector losses (0.03 dB for each fusion splice, 0.3dB for each mechanical splice, and/or 0.4 dB for each connector).
 - 3. Overall attenuation must meet TIA/EIA-568B standards. Perform attenuation tests at 850nm and 1300nm as appropriate.
- O. Confirm that loudspeakers and mountings are free of buzzes and rattles when the loudspeaker is swept with sine wave tones over its rated bandwidth at one-half (1/2) its maximum rated power.
- P. For all permanently mounted loudspeaker terminations, provide impedance measurement of each pair of loudspeaker lines with all loudspeakers connected and all amplifiers disconnected. These measurements shall be documented as editable tabular data listing impedance for each 1/3 octave band from 20 Hz to 20 kHz and shall be accurate to the nearest tenth of an Ohm.
- Q. For all intercom terminations, confirm proper operation by initiating and receiving audio communication and call light. For single lines connected to a matrix, test

each line with each channel in the matrix. Verify that all channels are quiet and without spurious noise.

- R. For all electronic devices mounted in racks and connected to patch bays, confirm:
 - 1. Every input and output is balanced.
 - 2. Proper polarity is maintained throughout the entire audio path.
 - 3. Tip connection of each TRS jack is connected to the positive terminal of each corresponding input or output.
- S. For all devices requiring IP addressing:
 - 1. IP addressing scheme must make use of subnets such that all devices, regardless on which network (Audio, Video, Control, or House) they reside, have a unique IP address to eliminate the possibility of duplicate IP addresses if networks are inadvertently cross-patched.
 - 2. All devices must have static IP addresses.
 - 3. Create a spreadsheet of all devices and their IP addresses, Subnet Masks, MAC Addresses, and other pertinent IP configuration information.
 - 4. Coordinate all IP addressing schemes with the Owner.
- T. If the Audio, Video, and Control network switches are dedicated to these systems and the systems do not rely on Owner furnished and configured network switches:
 - 1. Configure network switches to operate properly and provide the proper network configurations to support the network devices and protocols used by those devices.
 - 2. Configure, as needed, VLANs, IGMP, QOS, and other protocols requiring configuration to provide a fully functioning and robust network system.
 - 3. With all networks configured and operating, and all network devices configured and operating, confirm that the networks are behaving as expected and as required.
- U. Electrical Contractor, coordinating with the Systems Contractor must confirm that there are no shorts between the Neutral and Isolated Ground conductors, and between the isolated ground conductor and building ground for each AV Technical Power circuit. Electrical Contractor, coordinating with the Systems Contractor must confirm there are no Bootleg Grounds or Neutral-Ground Reversals on each AV Technical Power circuit.
- V. The Contractor is responsible for the programming and configuration of all DSP systems and control systems necessary as specified in this project specification and AV large format drawings.
 - 1. Programming and configuration must be complete and ready prior to System Designer's arrival for verification of functionality and acceptance testing.
 - 2. Programming for the DSP systems must contain control pages to support normal operations, and to support Systems Designer Testing and Commissioning operations, as described in this specification and the large format AV drawings.
 - 3. Programming for the Control Systems must include all master controller code and touch panel code and graphics, working together to provide the function as described in this specification and the large format AV drawings.

- W. Test all Audio, Video, and Control system controls, including but not limited to mixing consoles, switchers, routers, touch panels, paging stations, volume controls, and source selectors for proper operation.
- X. Test proper operation of any portable controls at each designated control location (Stage Manager's rack, for example).

3.11 SYSTEMS CONTRACTOR INITIAL SETTINGS

- A. All initial adjustments must be documented and submitted as part of the Systems Contractor Test Reports (see 1.5.C.3.j.ii and 3.12).
- B. Make all adjustments and modifications so that the system is operational and fully functional including but not limited to:
 - 1. Update all device software and firmware to the latest manufacturer's recommended release that allows for proper operation with ALL OTHER DEVICES in the systems.
 - 2. Make all adjustments and modifications for system gain structure per recommendations of major component manufacturers.
 - 3. Properly configure all EDID and HDCP settings to allow for proper function of all video systems.
 - 4. Install all programming for digital mixing consoles, DSP, Control and any other software-based devices in the systems, and verify that audio and video signal passes as designed through these systems. Verify that control systems function as specified. Refer to Section 1.3 for full scope of work description for programming.
 - 5. Properly balance all 70 Volt loudspeaker zones to be consistent from zone to zone using amplifier settings and loudspeaker taps to adjust for differing loudspeakers or installation height. All 70 Volt loudspeakers within a given zone must not have a broadband SPL variation of greater than +/- 2dB from center of speaker to center of speaker.
 - 6. Equalization and timing of the loudspeaker systems shall be further adjusted as required by the Systems Designer and Owner during Systems Designer Testing and Commissioning.

3.12 SYSTEMS CONTRACTOR TESTING REPORTS

- A. Submit written report detailing the results of Initial Adjustments and Systems Contractor Tests. Report to include, at minimum, the following:
 - 1. Copies of all relevant drawings, charts, test instrument data, and photographs.
 - a. PDF copies of all available manufacturers' operation and service literature for each major system component.
 - b. Copy of all programming files including, but not limited to, Audio DSP programming and Graphic User Interface (GUI) files, Control system Touch Panel GUI files and control system control programming files including un-compiled source codes.
 - c. All other documentation and results of testing and initial settings as referenced in 3.10, and 3.11 above.
 - d. Written certification that the installation conforms to the requirements stated herein, is complete in all respects, and is ready for inspection, Acceptance Testing, and tuning.

2. Prepare and submit an Avixa standard Commissioning Checklist for each system in this specification.
 3. Prepare and submit a training syllabus for Owner training (see section 3.14).
- B. This report shall be completed and submitted to the Systems Designer for review a minimum of five (5) days prior to Systems Designer Testing and Commissioning.

3.13 SYSTEMS DESIGNER TESTING AND COMMISSIONING

- A. Systems Designer Testing and Commissioning shall be performed by the Systems Designer and Contractor during a period designated by the Architect. Contractor shall furnish a minimum of three (3) technicians or one technician per Systems Designer commissioning team, for the acceptance testing period, and one or more engineers fully capable of programming DSP and Control systems and making any other engineering adjustments to equipment in the systems. Contact Systems Designer for number of commissioning teams that will be deployed. For Bid purposes assume there will be two (2) commissioning teams.
- B. The minimum time required for Systems Designer Testing and Commissioning is ten (2) working days, including six (6) hours of dedicated quiet and/or dark time. Coordinate this time period so that free access, work lighting, and electrical power are available on the site.
- C. Ensure that Systems areas are in a clean and orderly condition ready for acceptance testing.
- D. Provide test equipment (meeting the following minimum specifications) on site, at all times during Systems Designer Testing and Commissioning. Prior to testing, provide the Systems Designer with a listing of the specific equipment to be made available (#).
1. Oscilloscope: 10MHz Bandwidth, Sensitivity – 1mV/cm
 2. Digital Multi-meter: 1% Accuracy
 3. Function Generator: 1MHz Bandwidth, Distortion < 1%
 4. Real Time Analyzer: 1/3 Octave with microphone
 5. SMAART Analysis package with V.8 software and a minimum of two matching test microphones (Earthworks M30 or better)
 6. Pink Noise Source: 20 Hz – 20 kHz Bandwidth
 7. Test mic tone calibrator
 8. Impedance Sweep Meter: 20 Hz – 20 kHz Range, 1 Ohm – 50 kOhm
 9. Polarity Checker: Mic, line, or loudspeaker level
 10. Video Test Signal Generator(s): must provide all signals, resolutions, and output formats as needed to fully test the systems.

Systems Designers may choose to supply some of their own test equipment. Confirm specific requirements prior to commissioning

- E. Be prepared to verify the performance of any portion of the system by demonstration, listening tests and instrumented measurements.
- F. Be prepared to facilitate the visual inspection of system components and wiring, including removal of termination panels for inspection of wiring termination and wire management practices.

- G. Be prepared to demonstrate all software and control systems.
- H. Be prepared to go through the commissioning checklist and verify all items as complete.
- I. Make additional mechanical and electrical adjustments within the scope of the work and which are deemed necessary by the Systems Designer as a result of the Acceptance Tests. This may include focusing of loudspeaker systems, changes in system gain structures, grounding, filtering or interfaces.
- J. Contractor will bear any costs incurred for additional Systems Designer's time and expenses due to failure to have the system functioning in accordance with specification requirements at the times scheduled for Systems Designer Testing and Commissioning.

3.14 USER TRAINING

- A. Contractor will provide in-depth training in operation and regular maintenance of all systems and on all equipment included in the scope of work contained in this specification and the AV large format drawings.
- B. Training to include (but is not limited to):
 - 1. Required Manufacturer provided training.
 - 2. Detailed operation of mixing consoles, video switchers and routers, computer control systems and other essential system elements as relevant to their installation in this project.
 - 3. Maintenance and repair of system equipment, including replacement procedures for user-replaceable parts.
 - 4. Review of Operation and Maintenance Manual (See 3.15)
- C. Contractor will provide a minimum of six (6) training sessions of four hours each with times and dates to be approved by the Owner.
- D. The first session shall take place in the presence of the Systems Designer and shall occur directly after the completion of Systems Designer Testing and Commissioning. If the Systems Designer, Owner, and/or Architect judge any work to be deficient and/or not substantially complete at the time scheduled for training, the training will be postponed until the Systems Designer, Owner, and Architect judge the entire AV system conforms to this specification and the AV large format drawings.
- E. Contractor will bear any costs incurred for additional Systems Designer's time and expenses due to failure to have the system functioning in accordance with specification requirements at the times scheduled for User Training.

3.15 SYSTEMS DOCUMENTATION

- A. Systems Designer will review the Systems Documentation submittal (see 1.5.C.3.k) Upon approval of the documentation submittal, the Contractor will prepare five electronic copies stored on five separate USB storage devices and submit four to the Owner and the fifth to the Systems Designer.

3.16 FINAL ACCEPTANCE

- A. Final acceptance will be contingent upon issuance by the Systems Designer of a letter of acceptance stating that the work has been completed and is in accordance with the contract documents.

APPENDICES TO FOLLOW

APPENDIX A – AUDIO VIDEO NARRATIVE

HOFFMAN HALL

24 July 2026 – 50% Construction Documents

1. INTRODUCTION

Minot State University is planning a renovation of the Hoffman Hall to support lectures and experimental presentations.

2. AUDIO VIDEO SYSTEM – FACILITY-WIDE

2.1 OVERVIEW

The Auditorium and related spaces will be designed as an integrated solution. To achieve this goal, many of the AV technical systems are interconnected, allowing fluid exchange of audio and video material.

2.2 VIDEO TRANSPORT SYSTEM

The design features a networked video transport and matrix system allowing a flexible and efficient approach to routing sound and video. The system uses a series of networked video encode and decode devices that patch to a facility wide video LAN. Interconnections are achieved through control software and touch panel controllers, digitally connecting or disconnecting feeds from the display.

2.3 AV NETWORKS

The Audio Video networks are provided to transport audio, video, and control signals. These networks are intended to be integrated into the wider campus network allowing for access to shared resources and the wider internet where desired.

2.4 AV EQUIPMENT RACKS

Audio video equipment rack is the backbone of the system with space for:

- The digital signal processors (“DSP”) used to time align, “tune” and provide routing and control of the microphone and loudspeaker systems.
- Control and processing for all systems.
- The video distribution network system.
- Wireless receiver.
- University supplied computer.

3. AUDIO SYSTEM

3.1 SPEAKER SYSTEM

The lecture hall is covered by a series of pendant network loudspeakers. Each speaker can be individually routed and processed allowing for optimal listening conditions throughout the venue.

3.2 ASSISTIVE LISTENING SYSTEM

This system transmits stage sound or other selected program material by means of bluetooth wireless to individual receivers or user provided devices for the hearing impaired. Alternate uses of the system include transmission of audio descriptions for the sight impaired or simultaneous translation.

3.3 ROOM MICROPHONE SYSTEM

A series of beam-forming microphones are suspended in the lecture hall to pick up chamber picks up signals from the presenter and participants. The expectation that some lectures (those without significant noise from experiments) can be amplified using these microphones instead of the wireless lavalier microphone.

These microphones also provide audio feeds into recording or remote participation software.

The microphones can also supply positional information to the PTZ cameras noted below.

3.1 WIRELESS MICROPHONE SYSTEM

A single channel of wireless microphone with a lavalier microphone is integrated into the system.

4. VIDEO SYSTEM

4.1 LED SCREEN

A large LED screen at the front of the room provides primary video presentation for the room. It is sized such that participants at the back of the room can read text readily.

4.2 COMPUTERS

A university supplied computers allows teachers to access shared files and present, as well as record or include remote participants.

A university supplied podium style smart board provides the primary interface for the computer and source for the LED screen.

4.3 NETWORKED VIDEO TRANSPORT

Networked encoders and decoders on the video equipment allow for the vast majority of the technology to be safely in a rack outside of the hall.

This networked transport allows for both permanent and guest computers to access all of the AV facilities in the hall.

4.4 CAMERAS

Two broadcast quality Pan Tilt Zoom (PTZ) cameras with automatic tracking features provide video sources for recording and remote participation. One camera is intended to primarily track the presenter and the other is mounted behind the presenter primarily intended to catch attendees and their questions, however it could also be used for a rear view of an experiment.

A document camera is provided to allow small items and paper documents to be transmitted to the screen and thus also recorded or streamed.

5. CONTROLS

All controls for the AV systems are combined in a touch panel interface placed on the podium. If desired, this interface can be duplicated on the computer.

The control interface can select video sources, control microphone gain, and other functions all allowing instructors to use the room with a minimum of training and technical knowledge.

6. FURNITURE

An ADA compliant raiseable lectern is provided to host the smart board and touch panel.

APPENDIX B – AUDIO VIDEO MAJOR EQUIPMENT LIST

AUDIO VIDEO MAJOR AUDIO VIDEO EQUIPMENT LIST

QTY	MANUFACTURER	ITEM	DESCRIPTION
DSP and Control			
1	Middle Atlantic	UPS-S2200R	2200VA UPS Backup
1	QSC	Core Nano	DSP Core - 64x64 i/o, 8 AEC
1	QSC	TSC-70-G3	Touch Panel 7"
1	QSC	Dante 32x32 License	Dante 32x32 License
Wireless			
1	RF Venue	Diversity Architectural Antenna	Diversity Antenna for UHF Wall or Ceiling Mount, 140 Degree, confirm white or black
1	Shure	SLXD14+/93	Single Body back transmitter and receiver with WL93 Omni Lav
1	Audinate	AVIO 2 Input	Line Level XLR to Dante, 2 channel
Video			
2	Panasonic	AW-UE80	4K PTZ Camera 1/2.5 Sensor, Dome Style
1	ATS-Pro	TaylorLED WN Pro	1.5mm Pitch 13,78'x7.75' LED Wall with Mount and Trim
1	Novastar	MX30	LED Wall Processor
1	Visionary	D5200	Decoder 4k60 4:4:4 1 Gig Ethernet HDMI Out with USB upgradable to Dante
3	Visionary	E5000	Encoder 4k60 4:4:4 1G HDMI In
1	Visionary	D5000	Decoder 4k60 4:4:4 1 Gig Ethernet HDMI Out
2	Visionary	XB5	Conferencing Bridge, USB-C only
Speakers and Amps			
12	QSC	NL-P4	POE Network 4" Pendant Speaker
Microphones			
4	Shure	MXA925	Microphone Array Square or Round w/Al Features
Network			
1	Netgear	GSM4248PX	Network Switch 40 1G port with POE+ and 8 SFP+
1	Netgear	GSM4212PX	Network Switch 10 1G port (2 w/o POE) with 2 SFP+ and POE+
Computers			
1	TBD	TBD	Owner Supplied Computer
1	TBD	TBD	Owner Supplied Smart Tech Smart Board Podium
1	TBD	Keyboard and Mouse	For use with Keyboard Tray in Podium
1	IPEVO	VZ-R Ultra	Document Camera with HDMI and USB Connectivity
1	SuperLogics	SL-RMKB-W119e	1RU Rack Mount Drawer Monitor/Keyboard/Trackpad HDMI & USB
Racks			
1	Middle Atlantic	EWR-16-22SD	Wall Mount, 16RU, 22" Deep, Swinging, with door
1	Middle Atlantic	Rack Hardware	Lacing Bars, Cable Management, Blank Panels, Shelves as required
1	Middle Atlantic	Rack Power	MPR, RLM, PD series power components as required
1	TBD	TBD	Adjustable Lectern with keyboard tray, ADA compliant
Assisted Listening			
1	Listen	AURI-TX2N	Auri Bluetooth Transmitter
7	Listen	AURI-RX1	Auri Bluetooth Receiver
2	Listen	AURI-D4	Auri 4 Bay Charging Station
2	Listen	LA-438	Advanced Neck Loop
7	Listen	LA-165	Stereo Headphones

APPENDIX C – AUDIO VIDEO CONTROL NARRATIVE

END OF SECTION 27 41 00

SECTION 28 1000 - CONTROLLED ACCESS SYSTEM

1.1 DESCRIPTION

A. Work Included

1. Furnish and install a complete extension to the existing controlled access system. Include proximity readers, door sensors, cabling and other such products, equipment and wiring normally required for a complete and operational system.
2. All work in conjunction with this installation shall meet the provisions of the National Electrical Code and any other applicable codes.

B. Description of System

1. System to operate as follows:
 - a. Control electric strike door locks at locations indicated on drawings.
 - b. Provide access through doors via proximity card readers, mobile devices, or via request to exit sensors.
 - c. Monitor door positions.
 - d. Log all activities and provide override functions of system.
 - e. Provide paging to owner designated representative upon trouble alarm.
 - f. Work in conjunction with handicapped operator to disable handicapped pushplate operation when door is in lock mode. When door is in in lock mode, the card reader shall unlock and open door.

C. Work Not Included

1. Owner shall provide and install network switches, servers, and licenses required for operation of system.
2. Electric strike, handicapped pushplates and sensor shall be furnished by others. EC shall wire and install components.

1.2 SUBMITTALS

A. Shop Drawings

1. Provide information in accordance with Section 26 0500.
2. Indicate:
 - a. Mounting details.
 - b. Cabinet dimensions.
 - c. Wiring diagrams.
 - d. Description of devices.
 - e. Floor plan layout of devices.
 - f. Connection/riser diagram for specific project involved.

B. Manual

1. Provide information in accordance with Section 26 0500.
2. Include complete data for operation and maintenance of the system, consisting of:
 - a. Wiring diagrams.
 - b. Testing.
 - c. Maintenance.

- d. Description of system operation.
 - e. Addition of devices.
 - f. Frequency of testing procedures.
3. Provide three copies, one to remain in control panel, other copies for Record Manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURER/SUPPLIER

- A. The system specified is based on equipment as manufactured by Mercury Security and Altronix Power Supplies. All references to model numbers and other pertinent information is intended to establish the standards of operational concepts, performance, quality and appearance which must be met.
- B. Acceptable suppliers:
 - 1. Newvision, 1313 Republic St. Bismarck, ND, 701/222-8888.

2.2 CENTRAL SYSTEM

- A. Access Control Software
 - 1. Existing CBORD CS Gold.
- B. Control Panel (DC)
 - 1. Existing.
 - 2. Additional cards supplied by owner, installed by this contractor.
- C. Door Power Supply. (QTY. 1)
 - 1. 24VDC, 10 amp continuous output.
 - 2. Eight output individually PTC protected non power-limited output terminals as required by specific system topography.
 - 3. Integral battery backup with low power shut down.
 - 4. Capable of individually selectable fire alarm interface.
 - 5. Altronix #eFlow 4N8D Series or equivalent.
- D. Proximity Readers
 - 1. Indoor/Outdoor IP65 rated.
 - 2. Universal proximity and mobile credential compatibility.
 - 3. Wiegand output.
 - 4. Transmitting frequencies: 125 kHz, 13.56 MHz, and 2.4 GHz.
 - 5. Supply Voltage Range 5/16 VDC.
 - a. Standard Type
 - 1) 4.0" read range at 12VDC
 - 2) Single-gang rough-in mounting.
 - 3) Manufacturer: WaveLynx Ethos Model ET20.
 - b. Mullion Type
 - 1) 4.0" read range at 12VDC
 - 2) Surface mount design
 - 3) Manufacturer: WaveLynx Ethos Model ET10.

- E. Electric Door Strikes.
 - 1. 24 Volt DC.
 - 2. Supplied and installed by others.
- F. Motorized Electric Latch (panic device)
 - 1. 24 Volt DC.
 - 2. Low Power Version
 - a. 1.0 Amp inrush (0.5 sec)
 - b. 0.15 Amp holding.
 - 3. Power transfer hardware.
 - 4. Supplied and installed by others.
- G. Door Sensors
 - 1. Man-Door Type
 - a. Flush-mount type suitable for steel or wood doors.
 - b. Suitable for supervised inputs.
 - c. Manufacturer: Interlogix Model #1078 Series or equivalent.
- H. Cabling
 - 1. Card Reader Cable.
 - a. 6 conductor, 22 AWG, shielded.
 - b. Plenum rated.
 - c. 500' length limit.
 - 2. Electric Strike Cable.
 - a. 2 conductor, 18 AWG, shielded.
 - b. Plenum rated.
 - c. 500' length limit.
 - 3. Door Sensor Cable
 - a. 2 conductor, 22 AWG.
 - b. Plenum rated.
 - c. 500' length limit.

PART 3 — EXECUTION

3.1 STORAGE

- A. Store access system components in a cool, dry space prior to installation.

3.2 INSTALLATION

- A. General
 - 1. Install in accordance with Code, NRTL-listing and manufacturer's recommendations.
 - 2. Wiring to comply with all National, State and Local Codes.
 - 3. Locate devices as generally shown on Drawings and as indicated on installation instructions.
 - 4. Provide conduit where cables are concealed in walls, in mechanical rooms, and in rooms without ceilings.
- B. Proximity Readers

1. Standard type to be installed on solid walls. Use mullion type on any curtain wall systems or controlled doors with glass sidelights. Coordinate installation of any mullion style readers with supplier of frame system.
2. Where installed on masonry walls, readers shall be installed such that the top of the reader is even with block coursing

3.3 TESTS

- A. Furnish a letter of verification to Engineer indicating that the system has been tested by manufacturer's representative and is found to be complete and functional. List date of test and name of manufacturer's representative. Testing to include a functional test of all devices and verification of proper supervision for all devices. Notify Owner and Engineer one week in advance of scheduled tests.

3.4 CLEANING

- A. Clean and vacuum interior to remove all wire and insulation scraps, dust and dirt.
- B. Clean all exposed surfaces immediately prior to final inspection.

END OF SECTION 28 1000

SECTION 28 4600 - FIRE DETECTION AND ALARM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire alarm system and associated components, includes extension and modifications to existing system.

1.2 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 08 7100 - Door Hardware:
 - 1. Electrically-operated locks and electromagnetic door holders for interface with fire alarm system.
- C. Section 26 0533.16 - Boxes for Electrical Systems.

1.3 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2027.
- F. UL 38 - Standard for Manual Signaling Boxes for Fire Alarm Systems; Current Edition, Including All Revisions.
- G. UL 268 - Standard for Smoke Detectors for Fire Alarm Systems; Current Edition, Including All Revisions.
- H. UL 464 - Standard for Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories; Current Edition, Including All Revisions.
- I. UL 864 - Control Units and Accessories for Fire Alarm Systems; Current Edition, Including All Revisions.
- J. UL 1971 - Standard for Signaling Devices for the Hearing Impaired; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate arrangement of equipment with dimensions and clearance requirements of actual equipment.
2. Coordinate placement of devices and notification appliances with potential conflicts or view obstructions.
3. Coordinate work to provide power for equipment at required locations (e.g., smoke dampers, type of actuators, line or local control transformer, zoning, grouping and circuit activations).
4. Coordinate requirements for branch circuit protection, identification, and shunt trip if applicable.
5. Coordinate reflected ceiling plans to avoid conflicting placements; maintain minimum diffuser and detector clearances as indicated.
6. Coordinate submittals to confirm equipment and associated components are capable of indicated settings, and manufacturer documentation identifies required compatible product listings.
7. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

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

B. Evidence of designer qualifications.

C. Comply with NFPA 72 chapter "Documentation," including noting names of installers, owners, and system classification information.

D. Design Documents: Submit all information required for plan review and permitting by AHJ, including floor plans, riser diagrams, and description of operation.

1. Copy (if any) of list of data required by AHJ.
2. NFPA 72 "Record of Completion", filled out to extent known at time.
3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A, and complete listing of software required.
4. Manufacturer's detailed product data sheet for each component, including wiring diagrams, and circuit length limitations. Catalog pages and product descriptions include ratings, dimensions, finishes, service conditions, and included features.
5. Certification by manufacturer of FACU that system design complies with Contract Documents.
6. Certification by Contractor that system design complies with Contract Documents.

E. Shop Drawings: Submit installation documentation required for plan review and permitting by AHJ, including floor plans showing locations of fire alarm system components, enlarged drawn to identified scale plan view, and riser diagrams.

1. System zone boundaries and interfaces to fire safety systems.
2. Show locations of components, circuits, and raceways; mark components with identifiers used in control unit programming.
3. Include elevations and details of proposed equipment arrangements.

4. Include system interconnection schematic riser diagram showing proposed and approved cable size and type; coordinated with floor plans and describing circuit class, survivability, and application specific information required by NFPA 72.
 5. Include typical wiring diagrams for devices, notification appliances, remote indicators, annunciators, remote test stations, and EoL and power supervisory devices.
 6. Include requirements and control diagrams for interfacing with other systems.
 7. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; standby and spare capacity calculations; notification appliance circuit loop resistance and voltage drop calculations, including spare capacity.
 8. List of devices and notification appliances on each SLC, with spare capacity indicated.
 9. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
 10. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
 11. Detailed drawing of graphic annunciators, displays, and interfaces.
 12. Certification by either FACU manufacturer or manufacturer of related equipment.
 13. Certification by FACU manufacturer that system design complies with Contract Documents.
 14. Certification by Contractor that system design complies with Contract Documents.
- F. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- G. Inspection and Test Reports:
1. Submit inspection and test plan prior to closeout demonstration.
 2. Submit documentation of satisfactory inspections and tests.
 3. Submit NFPA 72 "Inspection and Test," filled out.
- H. Operating and Maintenance Data: See Section 01 7800 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:
1. Complete set of specified design documents, as approved by AHJ.
 2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
 3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
 4. List of recommended spare parts, tools, and instruments for testing.
 5. Replacement parts list with current prices, and source of supply.
 6. Detailed troubleshooting guide and large scale input/output matrix.
 7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
 8. Detailed but easy to read explanation of procedures require recording of system trouble events by qualified personnel, such as when routine testing is being conducted for fire drills and when entering into contracts for building renovations.
- I. Project Record Documents: See Section 01 7800 for additional requirements, have one set available during closeout demonstration:
1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
 2. "As installed" wiring and schematic diagrams, with final terminal identifications.

3. "As programmed" operating sequences, including control events by device, and updated input/output chart.
- J. Closeout Documents:
1. Certification by manufacturer that system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
 2. NFPA 72 "Record of Completion," filled out completely and signed by installer and authorized representative of AHJ.

PART 2 PRODUCTS

2.1 FIRE ALARM SYSTEM

- A. General Requirements:
1. Provide modifications and extensions to existing fire alarm system complying with NFPA 70, NFPA 72, NFPA 90A, and consisting of required equipment, conduit, cabinets, outlet boxes, wiring, connectors, hardware, supports, accessories, components, software, and system programming as necessary for complete operating system that provides functional intent indicated.
 2. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
 - a. 36 CFR 1191 and ADA Standards.
 - b. Requirements of AHJ.
 - c. Applicable local codes.
 - d. Contract Documents.
 - e. NFPA 72; "should" is mandatory; where conflicts between requirements require deviation, identify deviations clearly on design documents.
 3. Fire Alarm System Products:
 - a. Listed, classified, and labeled as suitable for purpose intended.
 - b. Installation Environments: Provide products suitable for their respective indoor and outdoor applications.
 4. Provide fire alarm circuits in accordance with NFPA 70.
 - a. Comply with methods of interconnecting FACUs in accordance with NFPA 72 and NFPA 70.
 - b. Power Sources:
 - 1) Comply with requirements for power supplies of emergency systems in accordance with NFPA 70.
 - 2) Primary: Dedicated branch circuits from facility power distribution system.
 - 3) Secondary: Storage batteries with capacity to operate system for period specified by NFPA 72.
 - c. Wiring and Wiring Methods:
 - 1) General Requirements:
 - a) Comply with requirements for wiring and wiring methods in accordance with NFPA 70.
 - b) Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum-rated, listed and labeled as suitable for use in return air plenums.
 - c) Special Occupancies: Comply with NFPA 70.

- d) Comply with NFPA 70 for wire and cable plenum, riser, general-purpose, limited-use, undercarpet, and underground applications.
 - 2) Fire Alarm Circuits:
 - a) Comply with NFPA 70 for conditions and types required for multiconductor cable systems.
 - b) Non-Power-Limited Fire Alarm (NPLFA) Circuits:
 - 1 Provide dedicated NPLFA non-GFCI branch circuits for fire alarm equipment and marked by red identification in accordance with NFPA 70.
 - c) Power-Limited Fire Alarm (PLFA) Circuits:
 - 1 Provide identification for PLFA circuits in accordance with NFPA 70.
- 5. Provide pathway class designations and pathway survivability, as defined in NFPA 72.
 - a. Provide monitoring of conductors and other signaling channels for integrity and circuit performance.
 - b. Pathway Class Designations:
 - 1) Unless otherwise indicated or required, pathways to meet the following requirements:
 - a) SLCs: Class B (star, tee-tap, multi-tap, with no return).
 - b) IDCs: Class B (daisy-chain with EoL resistor device installed at end of circuit).
 - c) NACs: Class B (daisy-chain with EoL resistor device installed at end of circuit).
- B. Fire Alarm System Interfaces and Control Functions:
 - 1. UL 864 listed unless otherwise indicated.
 - 2. Descriptions below are intended to provide means for interface. See project SOOs, narrative, and input/output matrix for execution requirements.
 - 3. Provide initiating devices, interfaces, and control functions for emergency control function interfaces in accordance with NFPA 72.
 - 4. Provide monitoring of interconnected systems. Coordinate notification appliance alternate markings as indicated on drawings.

2.2 FIRE ALARM CONTROL UNITS AND RELATED EQUIPMENT

- A. Manufacturers:
 - 1. Simplex
- B. Fire Alarm Control Units and Related Equipment: Listed and labeled as complying with UL 864.
- C. Provide cabinets and enclosures as indicated or as required to house system components.
- D. Fire Alarm Control Unit (FACU): Addressable.
 - 1. SLCs and IDCs: Configurable for Class B or Class A with additional modules.
 - 2. NACs: Integral and programmable with synchronization modules or cards as required.
 - 3. Power Supply: 120 VAC, 60 Hz, supplying necessary power for FACU.
 - 4. User-Interface: Touchscreen display for system interfacing and service mode settings, include password and user credentials; configurable for custom actions and incorporates historical event log.

5. Support self-testing detector capability.
6. Remote Annunciator Support: Up to 10.

2.3 FIRE ALARM SYSTEM INITIATING DEVICES

- A. Manufacturers:
 1. Simplex
- B. General Requirements:
 1. Provide devices and associated accessories suitable for intended application and location to be installed. Unless otherwise indicated, use addressable devices and addressable interface modules only in clean, dry, indoor, nonhazardous locations.
 2. Surface-Mounted Devices: Provide manufacturer's accessory surface mount backboxes or suitable outlet/device box.
 3. Devices for Outdoor and Damp/Wet Locations: Weatherproof, suitable for outdoor use; provide manufacturer's accessory backboxes or enclosures in accordance with product listing.
 4. Devices for Hazardous/Classified Locations: Listed and labeled as suitable for classification of installed location.
- C. Manual Fire Alarm Boxes/Pull Stations:
 1. Description: Match existing
 2. Alarm Initiation: Configured for general alarm initiation unless otherwise indicated; presignal stations (where indicated) require use of key to initiate general alarm.
 3. Operation: Dual-action unless otherwise indicated or required.
 - a. Dual-Action Operation: First requires pushing, pulling, or lifting, then pulling of lever.
 4. Color: Red, in accordance with NFPA 72.
 5. Station Reset: Requires use of key or tool.
- D. Spot-Type Detectors:
 1. Utilize plug-in mounting to separate base with tamper-resistant feature; provide bases as indicated or as required.
 2. Smoke Detectors:
 - a. Listed and labeled as complying with UL 268.
 - b. Provide sensor type (e.g., photoelectric, ionization) as indicated.

2.4 FIRE ALARM SYSTEM NOTIFICATION APPLIANCES

- A. Manufacturers:
 1. Simplex
- B. General Requirements:
 1. Provide signaling notification appliances listed for fire-protective service and intended operating mode, public or private; suitable for connection to FACU notification appliance circuits.
 2. Provide notification appliances and associated accessories suitable for intended application and location to be installed. Use notification appliances only according to listed mounting (e.g. ceiling, wall).

3. Surface-Mounted Notification Appliances: Provide manufacturer's accessory surface mount backboxes or suitable outlet/device box.
 4. Exterior Notification:
 - a. In addition to required occupant notification, provide notification appliances on exterior of building.
 5. Notification Appliance Derating: Include device derating adjustments in accordance with listing where applicable, including the following.
 - a. Where accessory protective guards or enclosures are utilized.
 - b. Where required by field conditions (e.g., ambient temperature and sound).
- C. Visible Notification Appliances:
1. Public Mode Operation: Listed and labeled as complying with UL 1971.
- D. Audible Notification Appliances:
1. Listed and labeled as complying with UL 464.
 2. Rated Sound Pressure Level: As required to achieve design sound pressure levels, but not less than 75 dBA at 10 feet for public mode operation or 45 dBA at 10 feet for private mode operation in accordance with UL 464.

2.5 WIRE AND CABLE

- A. General Requirements:
1. Comply with NFPA 70 listing and marking requirements for cables.
 2. Substitution of fire alarm listed cables for communication wiring, in accordance with NFPA 70, is not permitted.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install field-devices, components, FACU and related equipment, and accessories in accordance with the following:
1. Manufacturer's instructions, applicable codes, and Contract Documents.
- B. Field Locations:
1. Obtain Owner's approval of locations of devices and notification appliances before installation.
 2. Arrange equipment to provide minimum operational clearances and required maintenance access in accordance with manufacturer's instructions and NFPA 70.
 3. Conceal wiring, conduit, outlet boxes, and supports where installed in finished areas; maintain code-required access.
- C. Raceways and Supports:
1. Coordinate locations of outlet boxes as required for installation. Only install boxes and equipment at locations based on application standards indicated in NFPA 72.
 2. Secure and support raceways at intervals complying with NFPA 70. Provide supports where vertical rise exceeds permissible limits.
 3. Install firestopping to preserve fire resistance rating of partitions and other elements.
- D. Wiring and Connections:

1. Maintain separation of Class 1, Class 2, Class 3 remote-control, signaling, fire alarm circuits, and power-limited circuits in accordance with cable insulation class and NFPA 70.
 2. Maintain circuit pathway and class designations in accordance with NFPA 72 for configuration, separation, and survivability.
 3. Comply with permitted and not permitted installations for wires, cables, cable routing assemblies, communications circuits, and fire alarm circuits in accordance with NFPA 70.
 4. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by AHJ. Provide independent support from building structure and suspended ceiling systems. Do not provide support from raceways, piping, ductwork, or other systems.
 5. Provide grounding and bonding in accordance with Section 26 0526.
 6. Comply with manufacturer's minimum cable sizes or ratings.
 7. Do not exceed manufacturer's recommended maximum power, signal, or network cable lengths between components.
 8. Provide network wiring in accordance with NFPA 70.
 9. Neatly train and bundle conductors inside boxes, wireways, and cabinets.
 10. See manufacturer's instructions for batteries.
- E. Fire Alarm System Components:
1. Install field-installed devices, components, relays, notification appliances, accessories, and when applicable EoL resistors.
 - a. Install wiring to supervisory devices and associated EoL resistors as required for supervision of hardwired connections
 2. Install Wall-Mounted Equipment: Assemble component hardware within (e.g., card bays, sub-bays, expansion bays, signal cards, other card frames, networking, signal transmission, application modules, tamper monitoring devices, interconnecting modules, and auxiliary power supplies), including space for required spare capacity, and configure settings.
 3. Install Interconnect Wiring: Connect system cabinets, install processor and cards, cabling, connectors, terminations, and bonding.
- F. Branch Power:
1. After installation confirmations, follow manufacturer instructions to connect branch circuit power cables to premises fire alarm system components; comply with NFPA 70.
 2. Where accessories require auxiliary power, provide control power source and monitoring as indicated or as required to complete installation.
 3. Install auxiliary power supplies, including indicated monitoring, and connections necessary for remote equipment.
- G. System Identification:
1. Identify devices, notification appliances, components, cables, and equipment in accordance with approved submittals. See Section 26 0553.
 2. Confirm fire alarm system programming meets requirements of SOO and sub-system SOOs.
 3. Mark location of disconnecting means for NPFLA circuits.
 4. Coordinate to provide red branch power circuit protective devices or identify them accordingly as required by NFPA 72 and NFPA 70.
 5. Mark date of batteries installed on inside cover of panels and formal maintenance logs.
- H. Troubleshooting and Installer Checks:

1. Field test connectivity periodically during installation process to avoid unexpected troubleshooting.
 2. Check system operation for notification, FACU functions, circuit supervision, alarm initiating devices, supervisory initiating devices, dress panels/doors/covers, and programming before performing field tests.
- I. Fire Alarm System Tests:
1. Perform required tests of NFPA 72. Record measured values during operational checks.
 2. Confirm functional testing of fire alarm system is as indicated in Contract Documents.

3.2 INSPECTION AND TESTING FOR COMPLETION

- A. Notify Owner 7 days prior to beginning completion inspections and tests.
- B. Notify AHJ and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- C. Provide services of installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.
- D. Prepare for testing by ensuring that work is complete and correct; perform preliminary tests as required.
- E. Provide tools, software, and supplies required to accomplish inspection, testing, and document results.
- F. Perform inspection and testing in accordance with NFPA 72 and requirements of AHJ; document each inspection and test.
- G. Correct defective work, adjust for operation, and retest until entire system complies with Contract Documents.

3.3 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals for additional submittals.
- B. See Section 01 7900 - Demonstration and Training for additional requirements.
- C. Closeout Demonstration: Demonstrate operation of all functions to Owner.
 1. Be prepared to conduct any of required tests.
 2. Have minimum one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
 3. Have authorized technical representative of FACU manufacturer present during demonstration.
 4. Demonstration may be combined with inspection and testing required by AHJ; notify AHJ with enough time to schedule demonstration.
 5. Repeat demonstration until successful.

END OF SECTION 28 4600