

INVITATION NO. IFB 26-27 General Construction
IFB 26-28 Mechanical Construction
IFB 26-29 Electrical Construction
IFB 26-30 Total Combined Construction

Project No. 2621

**PROJECT MANUAL
for
BUILDING IMPROVEMENTS
Bldg. 3480
Camp Gilbert C. Grafton
Devils Lake, North Dakota**

Bids must be uploaded to the electronic bid depository at <https://bidexpress.com>, NOT later than 1:00 p.m. (CT) on Wednesday, September 9, 2026. The Office of the Adjutant General will NOT accept paper, faxed or emailed bids.

Bidding documents referred to herein upon which all bids for construction work shall be based are as follows:

One (1) Cover Sheet; Five (5) Architectural Sheets A090, A100, A700, A800, and A900; Six (6) Mechanical Sheets M001, M100, M200, M201, M301, and M401; and Five (5) Electrical Sheets E001, E100, E200, E300, and E400; dated July 31, 2026.

Specifications and sections included in accordance with Table of Contents and any Addenda issued prior to opening of bids.

OWNER

OFFICE OF THE ADJUTANT GENERAL
State of North Dakota
PO Box 5511
Bismarck, ND 58506-5511
Phone: (701) 791-3069

ARCHITECT

SHULTZ + ASSOCIATES ARCHITECTS
612 1/2 Main Avenue
Fargo, ND 58103
Telephone: (701) 476-0714
Fax: (701) 476-0709

MECHANICAL / ELECTRICAL ENGINEER

MBN ENGINEERING
701 Main Avenue
Fargo, ND 58103
Telephone: (701) 478-6336
Fax: (701) 478-6340

DATED: 11 August 2026

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NOTE: Listing of specifications under specific construction categories does not relieve the Contractors from becoming familiar with all specifications affecting his work.

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INVITATION TO BID

BUILDING IMPROVEMENTS

Bldg. 3480

Camp Gilbert C. Grafton

Devils Lake, North Dakota

IFB 26-27, IFB 26-28, IFB 26-29, IFB 26-30

An electronic bid depository, Bid Express, will be utilized for bidding. If you have **never** registered with Bid Express, the first step is to create an account at <https://bidexpress.com>. Central Time (CT) will be used when issuing the bid.

Once your business is registered, email a copy of your North Dakota Contractor's License to ng.nd.ndarnng.list.g9-contracts@army.mil. Upon confirmation of your North Dakota Contractor's License by this Agency, you will then be invited to access Bid Express, where the drawings, specifications, addendums, and project manual may be downloaded at no charge. Your emailed request must include the IFB number, along with contact information, including your name, business name, address, and telephone number.

All addendums related to this project will be uploaded to Bid Express. To receive timely notifications of addendums, complete the registration and invitation process in Bid Express. Do not wait until bid opening day to request your invite to Bid Express.

The closing date for submission of bids is Wednesday, September 9, 2026, at 1:00 p.m. CT. The electronic bid depository locks promptly at 1:00 p.m. CT and will not accept late bids. Bidders must begin the electronic submission process well in advance of the bid response deadline to allow for transmission and resolution of any technical difficulties. Be advised, the OWNER is not responsible for a Bidder's failure to timely submit a Bid Response due to any technical difficulties. If you experience technical difficulties, do not contact the OWNER. You must contact the customer service department at Bid Express (888) 352-2439. Be advised, paper, faxed or emailed bids, or bid modifications, will NOT be accepted by the OWNER. All modifications to bid prices must be made by the individual bidder, through the utilization of the electronic bid depository. The OWNER is not responsible for handling or overseeing last minute modifications.

Questions pertaining to the project specifications or drawings must be directed to the project architect, Shultz+ Associates Architects, one week prior to the bid opening. Therefore, the deadline for questions from prospective bidders is Wednesday, September 2, 2026.

In addition to downloading from Bid Express, the bidding documents are on file at plan rooms and builder's exchanges in the following North Dakota locations: Bismarck, Fargo, Grand Forks, Mandan, and Minot, as well as Rapid City, SD and Minneapolis, MN.

Bidders may submit separate bids for General Construction (IFB 26-27), Mechanical Construction (IFB 26-28) and/or Electrical Construction (IFB 26-29). In addition, the OWNER will allow the submission of a Total Combined Construction Bid (one single prime) for the complete project (IFB 26-30). In accordance with NDCC 48-01.2-06, the combined bid from a single prime

will not be accepted unless that bid is lower than the combined total of the lowest multiple bids for the project.

Bids will be read aloud via teleconference at 2:00 p.m. CT on Wednesday, September 9, 2026. To listen to the bid opening, you must call in using the following ID Number: (571) 616-7941; ID No. 844 000 912#

Each bid must be accompanied by a bidder's bond made payable to The Adjutant General, State of North Dakota, and executed by the bidder as principal and by a surety company authorized to conduct business in North Dakota, in a sum equal to five percent (5%) of the bidder's highest total bid combination, including all add alternates to the bid items; conditioned that if the bid is accepted and the contract awarded, the bidder within ten (10) business days after notice of such award, will effect and execute a contract in accordance with the terms of their bid and provide payment and performance bonds as required by North Dakota laws and regulations. A template entitled "AIA Document A310, Bid Bond", is provided within the electronic project manual and should be used to execute the bid guarantee.

In compliance with Section 43-07-12 of the North Dakota Century Code, each contractor submitting a bid must upload a copy of their North Dakota Contractor's License issued by the ND Secretary of State. Contractors must be licensed for the highest amount of their total bid combination including add alternates; and their ND Contractor's License must have been in effect at least ten (10) days prior to the date of the bid opening.

No bid will be read or considered which does not fully comply with the requirement herein for a bid bond and a ND Contractor's License. Both documents must be uploaded to "Bid Express" as separate attachments to your bid. A Certificate of Good Standing will NOT be accepted in lieu of a North Dakota Contractor's License.

The OWNER reserves the right to hold all legitimate bids for a period of thirty (30) days following the date fixed for the bid opening. It is the intent of the OWNER to award a contract to the lowest and best bidder. The OWNER further reserves the right to reject any or all bids and to waive irregularities and shall incur no legal liability for the State of North Dakota for the payment of any funds until the contract is awarded and approved by the proper authorities.

In compliance with Section 48-01.2-10 of the North Dakota Century Code, the successful bidder (awardee) shall be required to furnish payment and performance bonds covering the faithful performance of the contract award and the payment of all obligations thereunder, and all additional obligations required by the laws of the State of North Dakota. Each payment and performance bond shall be in an amount equal to the full amount of the contract award.

Questions may be directed to the Office of the Adjutant General, Contract Management Branch, Bismarck, North Dakota, Telephone (701) 791-3069.



AIA® Document A701® – 2018

Instructions to Bidders

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

THE OWNER:

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

OFFICE OF THE ADJUTANT GENERAL
State of North Dakota
PO Box 5511
Bismarck, ND 58506-5511

THE ARCHITECT:

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

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and 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.

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or Invitation to Bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and 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 or Owner, 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;
- .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;
- .7 the prices in this Bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor;
- .8 unless otherwise required by law, the prices which have been quoted in this Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to bid opening, directly or indirectly, to any other Bidder or to any competitor; and
- .9 no attempt has been made or will be made by the Bidder to induce any other person or firm to submit or not to submit a Bid for the purpose of restricting competition.

§ 2.2 Site Investigation and Conditions Affecting the Work

§ 2.2.1 The Bidder acknowledges that the Bidder has taken steps reasonably necessary to ascertain the nature and location of the Work, and that the Bidder has investigated and is satisfied as to the general and local conditions which can affect the Work or its cost, including but not limited to:

- .1 conditions bearing upon transportation, disposal, handling, and storage of materials;
- .2 the availability of labor, water, electric power, and roads;
- .3 uncertainties of weather, river stages, tides, or similar physical conditions at the site;
- .4 the conformation and conditions of the ground; and
- .5 the character of equipment and facilities needed preliminary to and during work performance.

§ 2.2.2 The Bidder also acknowledges that the Bidder is satisfied as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of the Bidding Documents. Any failure of the Bidder to take the actions described and acknowledged in this paragraph will not relieve the Bidder from responsibility for estimating properly the difficulty and cost of successfully performing the Work, or for proceeding to successfully perform the Work without additional expense to the Owner.

§ 2.2.3 The Owner assumes no responsibility for any conclusions or interpretations made by the Bidder based on the information made available by the Owner. Nor does the Owner assume responsibility for any understanding reached or representation made concerning conditions which can affect the Work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this Contract.

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.)

Bidding Documents may be downloaded from bidexpress.com after receiving access or obtained through local plan rooms and exchanges. Refer to the Invitation to Bid.

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

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

(Paragraph deleted)

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

(Paragraphs deleted)

§ 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.

§ 3.2.4 Where a clear understanding of the work is prevented due to contradictions between the drawings and the specifications, and there is not sufficient time to make an interpretation, correction, or change as per subparagraph

3.2.3, the Bidder shall consider the more restrictive conditions as governing and/or shall bid the larger quantity or better quality of work. Appropriate adjustment, if required, will be made after contract award.

§ 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. Under no condition, shall Bids be submitted on work or materials not approved by the Architect for this specific project, even though approval might have been given on other projects previously.

§ 3.3.6 Those requesting Architect consideration of their products as "equal" in accord with subparagraph 3.3.2, shall make such request in electronic PDF format providing space for Architect approval and/or comments on each item requested. An electronic PDF copy of the request form, with Architect action on same, will be returned to the proposer.

§ 3.3.7 Bidders and Sub-bidders submitting proposals on individually specified items of Work or on Work included in complete Specification sections, must quote in accord with all requirements of Plans and Specifications without modification or exclusion.

§ 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.)

Addenda will be uploaded to bidexpress.com and provided to local plan rooms and exchanges.

§ 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, or one which includes additional prior approvals, or one which is essential to the bidding process.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge receipt of all Addenda on the Bid Form. Failure to acknowledge all Addenda may cause rejection of Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids must be uploaded to the electronic bid depository at bidexpress.com. A sample Bid response form is included in the project manual labeled as "Sample Bid Form".

§ 4.1.2 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.

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

(Paragraphs deleted)

§ 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.)

Bidders Bond: 5%. Reference AIA Document A310 for an electronic template.

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish payment and performance bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder and all additional obligations required by the laws of the State of North Dakota. Should the Bidder refuse to enter into such Contract or fail to furnish payment and performance bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with paragraph 6.2.

§ 4.2.3 If a Bid Bond is required, it may be secured through the Bidder's usual sources provided the surety is licensed to do business in the State of North Dakota. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the attorney-in-fact's power of attorney. AIA Document A310, Bid Bond, will be provided by the Owner and should be used to execute the surety bond.

§ 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.)

Bids must be uploaded to the electronic bid depository at bidexpress.com.

§ 4.3.2 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.

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

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

(Paragraph deleted)

§ 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 through the online bid depository at bidexpress.com.

§ 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.)

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

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Specifications, and to determine the lowest and best Bidder on the basis of the sum of the Bid Items and Alternates accepted.

§ 5.3.3 If this Contract is funded in whole or in part with federal funds, the Owner shall not make any award or permit any award (subcontract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in federal assistance programs under the DOD implementation of 2 CFR Part 180 (at 2 CFR Part 1125).

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. Such bonds must cover all additional obligations required by the laws of the State of North Dakota.

§ 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 Required performance and payment bonds shall be secured through a surety licensed to do business within the state of North Dakota. If any surety upon any bond furnished in connection with the Contract becomes unacceptable to the State of North Dakota, or if any such surety fails to furnish reports as to the financial conditions of the surety from time to time as requested by the state of North Dakota, or if the Contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer, the Contractor shall promptly furnish such additional security as may be required to protect the interests of the State of North Dakota and of persons supplying labor or materials in the prosecution of the Work contemplated by this Contract.

§ 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.)

§ 7.1.5 Companies executing the bond as sureties must be among those appearing in the Treasury Department's list of approved sureties and must be acting within the limitations set forth therein.

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required payment and performance bonds to the Owner within ten days of notification of award of a contract for the Work. 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 before the date of the Contract execution.

§ 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.)

- .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.)

- .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.)

- .4** Building Information Modeling Exhibit, if completed:

N/A

- .5** Drawings:

Number

Title

Date

- .6** Specifications:

Section

Title

Date

Pages

- .7** Addenda:

Number

Date

Pages

- .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

- .9** Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

**BID OPENING: BIDS WILL ONLY BE ACCEPTED VIA THE BID DEPOSITORY AT
WWW.BIDEXPRESS.COM UNTIL 1:00 PM CT ON 9 SEPTEMBER 2026.**

GENERAL CONSTRUCTION
INVITATION NO: IFB 26-27

Office of the Adjutant General
ATTN: NGND-G9-CM
030 Fraine Barracks Lane (58504)
P.O. Box 5511
Bismarck, North Dakota 58506-5511

9 September 2026

The undersigned being familiar with the local conditions affecting the cost of the work, and after careful and complete examination of all sections of the Project Manual; to include Invitation to Bid, Instructions to Bidders, Bid Form, and sample Contract Documents; including General and Additional Conditions, Architectural/Engineering Specifications, and Drawings as prepared by Shultz + Associates Architects, Fargo, North Dakota and their consultants and the Office of the Adjutant General, Directorate of Installations and Environment; and

Issued Addenda No.'s _____

hereby proposes to furnish all labor, materials, equipment and services required for Building Improvements, Bldg. 3480, Camp Gilbert C. Grafton, Devils Lake, North Dakota, in accordance with the following:

BID ITEM NO. G-1: (BUILDING IMPROVEMENTS – BASE BID – GENERAL WORK):

_____ Dollars \$ _____

ALTERNATE BID ITEM NO. GA-1: (WINDOW REPLACEMENT):

_____ Dollars \$ _____

ALTERNATE BID ITEM NO. GA-2: (ADDITIONAL ELECTRONIC DOOR HARDWARE – GENERAL):

_____ Dollars \$ _____

The undersigned agrees to start and complete all work within the time limits set forth in Construction Schedule section of the specifications.

<The remainder of this page intentionally left blank.>

GENERAL CONSTRUCTION
INVITATION NO: IFB 26-27 (con't)

Accompanying and uploaded as an attachment to this bid, is a bidder's bond in a sum equal to five percent (5%) of the total bid, including all add alternates, which shall be forfeited to the Owner should the bidder fail to effect a contract and deliver Payment and Performance Bonds and other documents required by Instructions to Bidders within ten (10) days after receipt of notice to award.

In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of thirty (30) days after the opening of bids.

In compliance with the laws of the State of North Dakota, the undersigned is a licensed contractor duly registered with the Secretary of State under License Number _____, Class _____, which license has been renewed or granted on the _____ day of _____ 20____.

The names of all persons interested in the foregoing bid as principals are:

(NOTE: If bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder or other interested person is an individual, give first and last names in full.)

Respectfully submitted,

FIRM: _____

BY: _____
(e-signature)

TITLE: _____

Business Address: _____

Email Address: _____

Telephone No.: _____

Fax No.: _____

**BID OPENING: BIDS WILL ONLY BE ACCEPTED VIA THE BID DEPOSITORY AT
WWW.BIDEXPRESS.COM UNTIL 1:00 PM CT ON 9 SEPTEMBER 2026.**

MECHANICAL CONSTRUCTION
INVITATION NO: IFB 26-28

Office of the Adjutant General
ATTN: NGND-G9-CM
030 Fraine Barracks Lane (58504)
P.O. Box 5511
Bismarck, North Dakota 58506-5511

9 September 2026

The undersigned being familiar with the local conditions affecting the cost of the work, and after careful and complete examination of all sections of the Project Manual; to include Invitation to Bid, Instructions to Bidders, Bid Form, and sample Contract Documents; including General and Additional Conditions, Architectural/Engineering Specifications, and Drawings as prepared by Shultz + Associates Architects, Fargo, North Dakota and their consultants and the Office of the Adjutant General, Directorate of Installations and Environment; and

Issued Addenda No.'s _____

hereby proposes to furnish all labor, materials, equipment and services required for Building Improvements, Bldg. 3480, Camp Gilbert C. Grafton, Devils Lake, North Dakota, in accordance with the following:

BID ITEM NO. M-1: (BUILDING IMPROVEMENTS – BASE BID – MECHANICAL WORK):

Dollars \$ _____

The undersigned agrees to start and complete all work within the time limits set forth in Construction Schedule section of the specifications.

Accompanying and uploaded as an attachment to this bid, is a bidder's bond in a sum equal to five percent (5%) of the total bid, including all add alternates, which shall be forfeited to the Owner should the bidder fail to effect a contract and deliver Payment and Performance Bonds and other documents required by Instructions to Bidders within ten (10) days after receipt of notice to award.

<The remainder of this page intentionally left blank.>

MECHANICAL CONSTRUCTION
INVITATION NO: IFB 26-28 (con't)

In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of thirty (30) days after the opening of bids.

In compliance with the laws of the State of North Dakota, the undersigned is a licensed contractor duly registered with the Secretary of State under License Number _____, Class _____, which license has been renewed or granted on the _____ day of _____ 20____.

The names of all persons interested in the foregoing bid as principals are:

(NOTE: If bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder or other interested person is an individual, give first and last names in full.)

Respectfully submitted,

FIRM: _____

BY: _____
(e-signature)

TITLE: _____

Business Address: _____

Email Address: _____

Telephone No.: _____

Fax No.: _____

**BID OPENING: BIDS WILL ONLY BE ACCEPTED VIA THE BID DEPOSITORY AT
WWW.BIDEXPRESS.COM UNTIL 1:00 PM CT ON 9 SEPTEMBER 2026.**

ELECTRICAL CONSTRUCTION
INVITATION NO: IFB 26-29

Office of the Adjutant General
ATTN: NGND-G9-CM
030 Fraine Barracks Lane (58504)
P.O. Box 5511
Bismarck, North Dakota 58506-5511

9 September 2026

The undersigned being familiar with the local conditions affecting the cost of the work, and after careful and complete examination of all sections of the Project Manual; to include Invitation to Bid, Instructions to Bidders, Bid Form, and sample Contract Documents; including General and Additional Conditions, Architectural/Engineering Specifications, and Drawings as prepared by Shultz + Associates Architects, Fargo, North Dakota and their consultants and the Office of the Adjutant General, Directorate of Installations and Environment; and

Issued Addenda No.'s _____

hereby proposes to furnish all labor, materials, equipment and services required for Building Improvements, Bldg. 3480, Camp Gilbert C. Grafton, Devils Lake, North Dakota, in accordance with the following:

BID ITEM NO. E-1: (BUILDING IMPROVEMENTS – BASE BID – ELECTRICAL WORK):

_____Dollars \$ _____

ALTERNATE BID ITEM NO. EA-1: (ADDITIONAL ELECTRONIC DOOR HARDWARE - ELECTRICAL):

_____Dollars \$ _____

The undersigned agrees to start and complete all work within the time limits set forth in Construction Schedule section of the specifications.

Accompanying and uploaded as an attachment to this bid, is a bidder's bond in a sum equal to five percent (5%) of the total bid, including all add alternates, which shall be forfeited to the Owner should the bidder fail to effect a contract and deliver Payment and Performance Bonds and other documents required by Instructions to Bidders within ten (10) days after receipt of notice to award.

<The remainder of this page intentionally left blank.>

ELECTRICAL CONSTRUCTION
INVITATION NO: IFB 26-29 (con't)

In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of thirty (30) days after the opening of bids.

In compliance with the laws of the State of North Dakota, the undersigned is a licensed contractor duly registered with the Secretary of State under License Number _____, Class _____, which license has been renewed or granted on the _____ day of _____ 20__.

The names of all persons interested in the foregoing bid as principals are:

(NOTE: If bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder or other interested person is an individual, give first and last names in full.)

Respectfully submitted,

FIRM: _____

BY: _____
(e-signature)

TITLE: _____

Business Address: _____

Email Address: _____

Telephone No.: _____

Fax No.: _____

**BID OPENING: BIDS WILL ONLY BE ACCEPTED VIA THE BID DEPOSITORY AT
WWW.BIDEXPRESS.COM UNTIL 1:00 PM CT ON 9 SEPTEMBER 2026.**

TOTAL COMBINED CONSTRUCTION
INVITATION NO: IFB 26-30

Office of the Adjutant General
ATTN: NGND-G9-CM
030 Fraine Barracks Lane (58504)
P.O. Box 5511
Bismarck, North Dakota 58506-5511

9 September 2026

The undersigned being familiar with the local conditions affecting the cost of the work, and after careful and complete examination of all sections of the Project Manual; to include Invitation to Bid, Instructions to Bidders, Bid Form, and sample Contract Documents; including General and Additional Conditions, Architectural/Engineering Specifications, and Drawings as prepared by Shultz + Associates Architects, Fargo, North Dakota and their consultants and the Office of the Adjutant General, Directorate of Installations and Environment; and

Issued Addenda No.'s _____

hereby proposes to furnish all labor, materials, equipment and services required for Building Improvements, Bldg. 3480, Camp Gilbert C. Grafton, Devils Lake, North Dakota, in accordance with the following:

BID ITEM NO. TC-1: (BUILDING IMPROVEMENTS – BASE BID – TOTAL COMBINED GENERAL, MECHANICAL, AND ELECTRICAL WORK):

* Same Scope as Bid Items G-1, M-1, and E-1 Combined.

Dollars \$ _____

ALTERNATE BID ITEM NO. TCA-1: (WINDOW REPLACEMENT):

* Same Scope as Alternate Bid Item GA-1.

Dollars \$ _____

ALTERNATE BID ITEM NO. TCA-2: (ADDITIONAL ELECTRONIC DOOR HARDWARE – TOTAL COMBINED GENERAL AND ELECTRICAL WORK):

* Same Scope as Alternate Bid Items GA-2 and EA-1 Combined.

Dollars \$ _____

The undersigned agrees to start and complete all work within the time limits set forth in Construction Schedule section of the specifications.

TOTAL COMBINED CONSTRUCTION
INVITATION NO: IFB 26-30 (con't)

Accompanying and uploaded as an attachment to this bid, is a bidder's bond in a sum equal to five percent (5%) of the total bid, including all add alternates, which shall be forfeited to the Owner should the bidder fail to effect a contract and deliver Payment and Performance Bonds and other documents required by Instructions to Bidders within ten (10) days after receipt of notice to award.

In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of thirty (30) days after the opening of bids.

In compliance with the laws of the State of North Dakota, the undersigned is a licensed contractor duly registered with the Secretary of State under License Number _____, Class _____, which license has been renewed or granted on the _____ day of _____ 20____.

The names of all persons interested in the foregoing bid as principals are:

(NOTE: If bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder or other interested person is an individual, give first and last names in full.)

Respectfully submitted,

FIRM: _____

BY: _____
(e-signature)

TITLE: _____

Business Address: _____

Email Address: _____

Telephone No.: _____

Fax No.: _____



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)

OFFICE OF THE ADJUTANT GENERAL
State of North Dakota
PO Box 5511
Bismarck, ND 58506-5511

BOND AMOUNT: \$**PROJECT:**

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

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

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

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

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and 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.

Signed and sealed this day of ,

(Witness)

(Witness)

(Contractor as Principal) (Seal)

(Title)

(Surety) (Seal)

(Title)





AIA[®] Document A101[®] – 2017

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

AGREEMENT No. 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)

OFFICE OF THE ADJUTANT GENERAL
State of North Dakota
PO Box 5511
Bismarck, ND 58506-5511

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

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

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

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and 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.

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

§ 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.

Init.

/

[X] By the following date:

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

Portion of Work

Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

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

Item

Price

§ 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:
(Paragraph deleted)

Item

Quantity/Unit

Price per Unit (\$0.00)

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

Scheduled completion date carries a liquidated damages clause which is referenced in Article 13.7 General Conditions of the Contract for Construction.

§ 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:

The period covered by each Application for Payment shall be one calendar month. Email a draft copy of the Application for Payment to the Architect and the Construction Coordinator no later than the TENTH day of the following month, except the month of June.

§ 5.1.3

(Paragraphs deleted)

The Owner requires FORTY-FIVE days AFTER Owner's receipt of Certificate of Payment from the Architect/Engineer for processing and issuing of payment.

§ 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.)

10% of the Contractor's Total Completed and Stored to Date amount.

Init.

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

N/A

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

The Owner may withhold retainage as stated in Section 5.1.7.1 from payments otherwise due when less than 50% of the Contract Sum to Date is complete and from the payment due when 50% completion of the Contract Sum to Date is first attained. On subsequent payments, the Owner may withhold retainage equal to 5% of the Contract Sum to Date.

§ 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.)

Up to 95% of the amount previously retained may be paid at the discretion of the Architect/Engineer.

§ 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 45 days AFTER THE OWNER'S RECEIPT of the Architect's final Certificate of Payment.

§ 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.)

0 % per annum.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

(Paragraphs deleted)

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.

(Paragraphs deleted)

§ 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:

None.

Init.

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.)

N/A

- .5 Drawings

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

- .6 Specifications

Section
REFER TO EXHIBIT A FOR A SUMMARY LIST OF SPECIFICATIONS DESCRIBED IN THE PROJECT MANUAL.

- .7 Addenda, if any:

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

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

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

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

[] The Sustainability Plan:

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

[X] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
AGND Document 418	Labor Provisions Standards	April 2024	1-2
AGND Document 419	Federal Provisions	March 2025	1-4

- .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.)

	Number	Title	Date
	IFB	Invitation to Bid	
	AIA Document 701	Instructions to Bidders	2018 Edition
	N/A	Contractor's Bid Form	
	N/A	Contractor's Bid Bond	

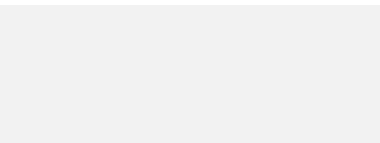
This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*

CONTRACTOR *(Signature)*

(Printed name and title)

(Printed name and title)





AIA® Document 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)

THE OWNER:
(Name, legal status and address)

OFFICE OF THE ADJUTANT GENERAL
State of North Dakota
PO Box 5511
Bismarck, ND 58506-5511

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.

§ A.2.2 Liability Insurance

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

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and 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.

§ A.2.3 Required Property Insurance

§ A.2.3.1 If required in Administrative Requirements, Section 01 3000 of the Specifications, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. This property insurance shall in no case be less than that specified in Exhibit A of the Standard Form of Agreement. 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 Paragraph 9.10 of AIA Document 201 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph A.3.4 to be covered, whichever is later. The Owner (The Adjutant General, State of North Dakota) and all Contractors, Subcontractors and Sub-subcontractors in the Project shall be endorsed on this policy as additional insureds.

§ 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 Contractor 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.** A property insurance deductible is allowed as identified in Exhibit A of the Contract for Construction. The Contractor purchasing and maintaining this insurance shall pay all costs not covered because of such deductible, except that each and every Contractor (prime, subcontractor, sub-subcontractor, etc.) who sustains a loss shall be responsible for said deductible as pertains to materials and/or equipment stored off the site or in transit. Once materials and/or equipment are on site or have been installed and are a permanent part of the building itself, all losses shall be the responsibility of the Contractor furnishing the property insurance.

§ 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, Automobile 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 insurance required by Subparagraph 11.1.1 of AIA Document 201 General Conditions of the Contract for Construction shall be written for not less than the limits of liability specified in Exhibit A or required by law, whichever coverage is greater. Neither the Owner nor the Architect shall be responsible in the event limits are insufficient. Coverages shall be written on an occurrence basis and shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. Products and completed operations coverage will be maintained for a period of one year after final payment unless longer warranty period is specified.

§ 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 \$500,000.00 per person, \$2,000,000.00 each occurrence, \$2,000,000.00 general aggregate, and \$2,000,000.00 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 \$500,000.00 per person and \$2,000,000.00 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 \$2,000,000.00 per occurrence.

§ 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 Only if applicable, 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 \$1,000,000.00 per claim and \$1,000,000.00 in the aggregate.

(Paragraphs deleted)

§ 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** Unless otherwise provided in the Contract Documents, this property insurance shall cover portions of the Work stored off the site and portions of the Work in transit in the limits specified in Exhibit A of the Contract for Construction.
- ☐ **§ 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

Init.

§ 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)
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:

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AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

THE OWNER:

(Name, legal status and address)

OFFICE OF THE ADJUTANT GENERAL
State of North Dakota
PO Box 5511
Bismarck, ND 58506-5511

THE ARCHITECT:

(Name, legal status and address)

TABLE OF ARTICLES

1	GENERAL PROVISIONS
2	OWNER
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4	ARCHITECT
5	SUBCONTRACTORS
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7	CHANGES IN THE WORK
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9	PAYMENTS AND COMPLETION
10	PROTECTION OF PERSONS AND PROPERTY
11	INSURANCE AND BONDS
12	UNCOVERING AND CORRECTION OF WORK
13	MISCELLANEOUS PROVISIONS

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.

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

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES



Init.

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User Notes:

(1278236746)

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.

§ 1.2.4 Omissions from the drawings or specifications or the mis-description of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or mis-described details of the work but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

§ 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

§ 1.4.1 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.

§ 1.4.2 In the event of conflicting provisions, the more specific provision will take precedence over the less specific; the more stringent will take precedence over the less stringent; the more expensive item will take precedence over the less expensive. On all drawings, figures take precedence over scaled dimensions. Scaling of dimensions, if done, is done at the Contractor's own risk. In case of a conflict between the Contract Documents, if not reconciled by Addendum, the Architect/Engineer and the Owner will determine which document is the most specific and the Contractor shall do the Work accordingly, at no change in price.

§ 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.

(Paragraphs deleted)

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 Information and Services Required of the Owner

§ 2.2.1 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.

§ 2.2.2 The term "Architect," throughout these Contract Documents, refers to the person or entity lawfully engaged in the practice of architecture or engineering and who is identified as the Architect or Engineer on page one of the Standard Form of Agreement Between Owner and Contractor (AIA® Document A101®).

§ 2.2.3 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.

§ 2.2.4 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.

(Paragraphs deleted)

§ 2.2.5 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.

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

§ 2.3 Owner's Right to Stop the Work

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

§ 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have,

correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.1.4 If the Contractor hereunder is comprised of more than one legal entity, each entity shall be jointly and severally liable hereunder.

§ 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 and geotechnical report, if any.

§ 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, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such construction means, methods, techniques, sequences or procedures. If the Contractor determines that such construction means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, as approved by the Owner. If the Contractor is then instructed to proceed with the required construction means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures

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

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

§ 3.4 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.

§ 3.5.3 The Contractor shall furnish to the Architect, when requested, material certifications on manufactured items to be used on this project.

§ 3.5.4 Defects of any kind, due to faulty work or materials appearing during the above-mentioned period must be immediately made good by the Contractor at the Contractor's own expense to the entire satisfaction of the Owner and Architect. Such construction and repairs shall include the costs of all damages to the finish or furnishings of the building resulting from the original defect or repairs thereto. Where equipment is required to be replaced, the one-

year warranty shall be reinstated for that piece of equipment from date of replacement.

§ 3.5.5 The Contractor shall guarantee and maintain the stability of all work and materials and keep same in perfect 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, such guarantee shall continue for a period of one year from the date the Owner takes possession.

§ 3.5.6 The guarantee shall 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 any responsibilities during the guarantee period.

§ 3.5.7 This guarantee shall be extended where other guarantees for different lengths of time are specifically called for in the Contract Documents or where manufacturer's standard warranties extend for a longer period.

§ 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. Where the Contract Documents require Work better than that required by statute, the Contract Documents shall govern.

§ 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. In the event the Contractor does not employ a superintendent, the Contractor must subcontract with another entity to ensure a competent superintendent meets the requirements of this section. 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 Contingent upon the Prime General Contractor's Work being timely scheduled and performed, the Contractor shall, within ten days after Contract award or another period of time determined by the Owner and Architect, prepare and submit to the Architect for approval, five copies of a practicable schedule showing by written description, the order in which the Contractor proposes to perform the Work, and the dates on which the Contractor contemplates starting and completing the several salient features of the Work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of Work scheduled for completion by any given date during the period.

§ 3.10.2 The schedule shall not exceed the time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project or by the Architect, shall be related to the entire Project to the extent required by the Contract Documents, shall provide for expeditious and practicable execution of the Work and shall allow the Architect reasonable time to review all required submittals.

§ 3.10.3 If the Contractor fails to submit or resubmit an approved schedule within the time prescribed, the Architect may withhold approval of progress payments until the Contractor submits the required schedule.

§ 3.10.4 Contingent upon the Prime General Contractor's Work being timely scheduled and timely performed, during construction, the Contractor shall enter the actual progress on the chart as directed by the Architect. If, in the opinion of the Architect, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve progress, including those that may be required by the Architect, without additional cost to the State. In this circumstance, the Architect may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or

schedules in chart form as the Architect deems necessary to demonstrate how the approved rate of progress will be regained.

§ 3.10.5 Failure of the Contractor to comply with the requirements of the Architect under this clause shall be grounds for a determination by the Owner and Architect that the Contractor is not prosecuting the Work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Owner may terminate the Contractor's right to proceed with the Work, or any separable part of it, in accordance with the termination for cause terms of this Contract.

§ 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. 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. If shop drawings, samples, or similar submittals are not resubmitted to the Architect after the Architect has made corrections thereto, it will be assumed the Contractor has checked and approved all corrections made.

§ 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.

§ 3.12.11 The Architect and Owner may duplicate, use and disclose, in any manner and for any purpose, shop drawings delivered under this Contract and all subcontracts hereunder at any tier.

§ 3.13 Use of Site

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

§ 3.13.2 The Contractor shall at all times so conduct the Work as to ensure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the Work, and to ensure the protection of persons and property. No road or street shall be closed to the public except with the permission of the proper authorities. Fire hydrants on or adjacent to the Work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor to ensure the use of sidewalks and the proper functioning of all gutters, sewer inlets, drainage ditches, irrigation ditches, etc., which shall not be obstructed.

§ 3.13.3 The Contractor shall hold and save the Owner, its officers, employees, and agents, free and harmless from liability of any nature occasioned by 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, 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 and authorized representatives of the State and Federal Governments with access to the Work in preparation and progress wherever located. The Contractor shall furnish without additional charges, all reasonable facilities necessary for safe and convenient inspections. 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.

§ 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 Contractor agrees to defend, indemnify, and hold harmless the state of North Dakota, its agencies including Owner, officers, and employees (State), from claims resulting from the performance of the contractor or its agent, including all costs, expenses and attorneys' fees, which may in any manner result from or arise out of this agreement, except claims based upon the State's sole negligence or intentional misconduct. The legal defense provided by Contractor to the State under this provision must be free of any conflicts of interest, even if retention of separate legal counsel for the State is necessary. Any attorney appointed to represent the State 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 State 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 agreement.

§ 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, and from time to time during the one-year period for correction of Work as described in 12.2. 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 work and 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 any person or entity declared ineligible under Federal laws or regulations from participating in Federally assisted construction projects or to whom the Owner or the Architect has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom the Contractor has a reasonable objection.

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

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity previously selected and to whom the Owner and Architect have made no reasonable objection except with the written consent of the Owner and Architect.

§ 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.

§ 7.1.4 Neither the Owner nor the Architect is responsible to give notice of Change Orders, Construction Change Directives, and/or orders for minor changes in the Work to the surety (if any).

§ 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 The Contractor, in connection with any proposal for a Change Order, shall furnish a price breakdown, itemized as required in Subparagraph 7.2.3 below. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all materials, labor, equipment, subcontract, and overhead costs, as well as profit, and shall cover all work involved in the change proposal, whether such work was deleted, added, or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown. In addition, if the change proposal includes a time extension, a justification therefor, shall also be furnished. The proposal, together with the price breakdown and time extension justification, shall be furnished by the date specified by the Owner.

§ 7.2.3 Costs for proposals to perform changes in the Work consisting of additions, deletions, or other revisions shall be limited to the following:

- .1 Actual labor costs involved to include fringe benefits required by agreement or custom plus ten (10%) for all labor overhead factors which include job superintendent salary and subsistence.
- .2 Actual costs of materials, supplies, and equipment including all transportation costs and applicable taxes
- .3 Actual rental costs of machinery and equipment, exclusive of hand tools
- .4 Ten percent (10%) of direct labor, material, supplies, equipment, and rental gross amounts and ten percent (10%) of subcontracts for all overhead and profit factors, which includes all insurance costs.
- .5 One percent (1%) for all bond premium adjustments unless actual costs are greater as evidenced by invoices or other data.
- .6 Credits are to be calculated in a similar manner, but not including overhead and profit factors, except when both additions and credits covering related Work or substitutions are involved in a change proposal, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change proposal.

§ 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;
- .4 As provided in Section 7.3.4; or
- .5 By the method provided in subparagraph 7.2.3. This method will be utilized exclusively for all construction change directives unless other above listed methods are specifically authorized by Owner.

§ 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, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with such costs.

§ 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; 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. The following will not be considered justifications for extension of time unless due to one of the cause stated within this Article 8: (a) delay caused by subcontractors, sub-subcontractors, or suppliers, except if the supplier goes out of business and another supplier cannot be found in time to meet the schedule; (b) shortage of employees.

§ 8.3.2 Claims relating to time shall be subject to the same notice and timing requirements as any other claim.

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

§ 8.4 Notices to the Owner of Labor Disputes

§ 8.4.1 If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this Contract, the Contractor shall immediately give notice, including all relevant information, to the Owner.

§ 8.4.2 The Contractor agrees to insert the substance of this clause, including this paragraph 8.4.2, in any subcontract to which a labor dispute may delay the timely performance of this Contract, except that each subcontract shall provide that in the event its timely performance is delayed or threatened by delay by any actual or potential labor dispute, the subcontractor shall immediately notify the next higher tier subcontractor or the prime Contractor, as the case may be, of all relevant information concerning the dispute.

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 and which are accompanied by a Change Order indicating the parties' agreement with costs associated with such Work.

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

§ 9.3.1.3 Contractor shall submit Application for Payment to Architect, with signature, to include notarization of Contractor's signature. Said application for payment shall be written on AIA Document G702, Application and Certificate for Payment, templates of which shall be furnished by the Owner.

§ 9.3.1.4 If required by Architect, Contractor shall furnish with each Application for Payment lien waivers from specified subcontractors and suppliers for labor and materials approved for progress payment under previous application.

§ 9.3.1.5 Applications for payment made prior to Substantial Completion shall reflect a retainage equal to 10% of the Contractor's Total Completed and Stored to Date amount. The Owner may withhold retainage from payments otherwise due when less than 50% of the Contract Sum to Date is complete and from the payment due when 50% completion of the Contract Sum to Date is first attained. On subsequent payments, the Owner may withhold retainage equal to 5% of the Contract Sum to Date. Upon Substantial Completion of the Work, up to 95% of the amount previously retained may be paid at the discretion of the Architect. Final payment of all moneys due the Contractor shall be made immediately following completion and acceptance of the project as provided in paragraph 9.10.

§ 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.

§ 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.

(Paragraph deleted)

§ 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. The Owner shall have forty-five days AFTER receipt of Certificate for Payment from Architect for administrative processing and issuance of payment. No contractor payment shall become due and/or unpaid prior to the expiration of said forty-five day period.

§ 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 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 Retainage and payments of to the Contractor will be pursuant to N.D.C.C. § 48-01.2-13.

§ 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.

§ 9.10.6 Items specifically required by Owner to be submitted by Contractor prior to final payment as per Subparagraph 9.10.2 as a minimum, are enumerated as follows:

- .1 Contractor's Affidavit of Payment of Debts and Claims, conditioned that the Contractor has satisfied all obligations for all materials and equipment furnished and all work, labor, and services performed in connection with the performance of this Contract, and further, that the Contractor will indemnify the Owner against all liability for any and all claims, judgments, and costs brought or obtained by subcontractors, all suppliers of materials and equipment, and all performers of work, labor, or services arising in any manner out of the performance of the Contract.
- .2 Consent of Surety to Final Payment (if performance/payment bonds were required).
- .3 Contractor's Release or Waiver of Liens.
- .4 Current Statement of ND Tax Commissioner relating to income tax and sales tax clearance.
- .5 Current Certificate of Premium Payment to North Dakota Workforce Safety and Insurance.

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.

§ 10.1.1 When required by the Owner, 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 shall 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.

.6 a safety training program including safety "toolbox" meetings and other systems for ongoing training and also including training for employees on the recognition, avoidance, and prevention of unsafe conditions.

§ 10.1.2 It will be a condition of this Contract and shall be made a condition of each subcontract entered into pursuant to this contract, that the Owner shall assume 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.

§ 10.2 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 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.

§ 10.3.4 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.

§ 10.3.5 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.

§ 10.3.6 No material, supplies, or equipment shall be furnished or installed by the Contractor for this Project which contains hazardous materials. A hazardous material is any material, because of its quantity, concentration, physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or the environment if released into the workplace or the environment; or any material that is required to have a Safety Data Sheet.

§ 10.3.7 Exceptions to 10.3.6:

- .1 Lubricating oil is exempt if the total volume of each type of lubricating oil handled at that facility does not exceed 55 gallons, and the total volume of all types of lubricating oil handled at that facility does not exceed 275 gallons at any one time.
- .2 Hazardous material contained solely in a consumer product for direct distribution to, and use by, the general public (this exemption does NOT include the materials used to manufacture these products).
- .3 Any material that is in transit under active shipping papers and are on site for 30 days or less.
- .4 The on-premises use, storage, or both, of propane in the amount not to exceed 300 gallons used for the sole purpose of heating the employee work areas within the business.

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

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving the Contractor's indemnity obligations under Section 3.18, however such coverage shall not limit the Contractor's indemnity obligations.

§ 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.

§ 11.1.5 The liability insurance required by Section 11.1.1 shall be written for not less than \$2,000,000 per occurrence, \$2,000,000 aggregate limit for bodily injury, property damage, personal injury, contractual and completed operations/product liability, EXCEPT that these amounts may be higher if insurer furnishing the umbrella or excess coverage requires larger amounts.

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

§ 11.1.7 **Certificates of Insurance.** The Contractor shall provide certificates of insurance acceptable to the Owner 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 period for correction

of Work. The certificates shall show the Owner as an additional insured on the Contractor's commercial general liability and excess or umbrella liability policy or policies.

§ 11.1.8 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.

§ 11.1.9 The insurance coverages listed above must meet the following additional requirements:

- 1) Any deductible or self-insured retention amount or other similar obligation under the policies shall be the sole responsibility of the Contractor. Optional Provision: The amount of any deductible or self-retention is subject to approval by the State.
- 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 the State. The policies shall be in form and terms approved by the State.
- 3) The State 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 above. The duty to indemnify the State under this agreement shall not be limited by the insurance required in this agreement.
- 4) The state of North Dakota and its agencies, officers, and employees (State) shall be endorsed on the commercial general liability policy on a primary and noncontributory basis, including any excess policies (to the extent applicable), as additional insured. The State 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 agreement or by the contractual indemnity obligations of the Contractor.
- 5) The insurance required in this agreement, through a policy or endorsement, shall include:
 - a) a "Waiver of Subrogation" waiving any right to recovery the insurance company may have against the State.
 - b) 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.
 - c) cross liability/severability of interest for all policies and endorsements.
 - d) The legal defense provided to the State under the policy and any endorsements must be free of any conflicts of interest, even if retention of separate legal counsel for the State is necessary.
 - e) 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.
- 6) The Contractor shall furnish a certificate of insurance to the undersigned State representative prior to commencement of this agreement. All endorsements shall be provided as soon as practicable. The Contractor shall provide a certificate of insurance prior to commencement of this agreement and any required endorsements as soon as practicable electronically to:

OFFICE OF THE ADJUTANT GENERAL
ng.nd.ndarng.list.g9-certified-payrolls@army.mil

- 7) Failure to provide insurance as required in this agreement is a material breach of contract entitling the State to terminate this agreement immediately.
- 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.

§ 11.2 Waivers of Subrogation

§ 11.2.1 The Owner does not waive any rights against the Contractor (term "Contractor" includes any of Contractor's subcontractors, sub-subcontractors, agents and employees, each of the other) for losses caused by Contractor's negligence or intentional act or failure to act.

(Paragraphs deleted)

§ 11.3 Adjustment and Settlement of Insured Loss

§ 11.3.1 All references in above listed paragraphs that refer to Owner's duties/responsibilities, Owner's property insurance, Owner as "fiduciary", etc., shall be changed to mean Contractor's duties/responsibilities, Contractor's property insurance, Contractor as "fiduciary", etc. The Contractor referred to in these paragraphs is that Contractor responsible for purchasing and maintaining the property insurance.

(Paragraphs deleted)

§ 11.3.2 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. 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.

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. 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.

(Paragraph deleted)

§ 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

This Contract is governed by the laws of the State of North Dakota. Any action to enforce this Contract must be brought in the State District Court of Burleigh County, North Dakota.

§ 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 within forty-five (45) days of the due date shall bear 0.00% interest per annum.

§ 13.6 Maintenance of Records by Contractor

The Contractor shall maintain all directly pertinent books, documents, papers, and other records involving transactions related to this Contract for three years after the Owner makes final payment and all other pending matters are closed.

§ 13.7 Liquidated Damages

§ 13.7.1 The parties agree that damages for non-performance by the Contractor would be difficult to estimate at the time of entering this contract. If the Contractor fails to complete the Work within the time specified in the Contract, or any extension, the Contractor shall pay to the Owner as liquidated damages the amount of \$100.00 for each day of delay, plus any costs incurred by the Owner for legal review and Contract modification.

§ 13.7.2 If the Owner terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Owner in completing the Work.

§ 13.7.3 If the Owner does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the Work is completed or accepted.

§ 13.8 Hiring Preference

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.

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

§ 14.1.3 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 14.1.2.

(Paragraph deleted)

§ 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 order the Contractor in writing to suspend, delay or interrupt the Work of this Contract for the period of time that the Owner determines appropriate for the convenience of the State.

§ 14.3.2 If the performance of all or any part of the Work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Owner in the administration of this Contract, or (2) by the Owner's failure to act within the time specified in this Contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this Contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the Contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this Contract.

§ 14.3.3 A claim under this clause shall not be allowed:

- .1 for any costs incurred more than 21 days before the Contractor shall have notified the Owner in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension

- order), and
- .2 unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner, by written notice, may terminate this Contract, in whole or in part, when it is in the best interest of the State. If this Contract is so terminated, the Owner shall be liable only for payment in accordance with the payment provisions of this Contract for Work executed prior to the effective date of termination, and costs incurred by reason of such termination.

§ 14.4.2

(Paragraphs deleted)

If this Contract is so terminated, the Owner shall be liable only for payment in accordance with the payment provisions of this Contract for Work executed prior to the effective date of termination, and costs incurred by reason of such termination.

(Paragraphs deleted)

§ 14.5 Termination by the Owner for Lack of Funding or Authority

§ 14.5.1 The Owner, by written notice, may terminate this Contract under any of the following conditions:

- .1 If funding from federal, state, or other sources is not available at levels sufficient to allow for the continuation of the Work.
- .2 If federal or state laws or rules are modified or interpreted in a way that the Work under this contract is no longer eligible for the funding proposed for payments authorized by this contract.
- .3 If any license, permit or certificate required by law or rule, or by the terms of this contract, is for any reason denied, revoked, suspended or not renewed.

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, 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.

(Paragraphs deleted)

§ 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. The Owner does not agree to binding arbitration, mediation or any other form of mandatory Alternative Dispute Resolution. The parties may enforce the rights and remedies in judicial proceedings. The Owner does not waive any right to a jury trial.

§ 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 litigation.

§ 15.2.6 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.

(Paragraph deleted)

§ 15.2.7 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.

(Paragraph deleted)

§ 15.3 Alternative Dispute Resolution

The parties under this Contract shall have the option to resolve disputes by means of alternative dispute resolution. However, the Owner does not agree to any form of binding arbitration, mediation, or other forms of mandatory alternative dispute resolution, nor does the Owner waive any right to a jury trial. The parties shall retain their right to seek remedies in judicial proceedings.

(Paragraphs deleted)

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LABOR STANDARDS PROVISIONS

CONTRACT WORK HOURS AND SAFETY STANDARDS ACT (CWHSSA)

1.1 OVERTIME REQUIREMENTS

1.1.1 No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

1.2 VIOLATION - LIABILITY FOR UNPAID WAGES LIQUIDATED DAMAGES

1.2.1 In the event of any violation of the clause set forth in paragraph 1.1.1 the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1.1.1, in the sum of \$32 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1.1.1.

1.3 WITHHOLDING FOR UNPAID WAGES AND LIQUIDATED DAMAGES

1.3.1 **Withholding process.** The Contracting Officer may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section of the contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in [§ 5.2](#)). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the

same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

1.3.2 **Priority to withheld funds.** The Department has priority to funds withheld or to be withheld in accordance with paragraph 1.3.1 over claims to those funds by:

- .1 A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- .2 A contracting agency for its procurement costs;
- .3 A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- .4 A contractor's assignee(s);
- .5 A contractor's successor(s); or
- .6 A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901-3907](#).

1.4 SUBCONTRACTS

1.4.1 The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1.1 through 1.5 of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1.1 through 1.5. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

1.5 ANTI-RETAILIATION

1.5.1 It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

- .1 Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
- .2 Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
- .3 Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
- .4 Informing any other person about their rights under CWHSSA or this part.

1.6 PAYROLL AND BASIC RECORDS

1.6.1 The Contractor and its subcontractors shall maintain payrolls and basic payroll records for all laborers and mechanics working on the contract during the contract and shall make them available to the Government until 3 years after the prime contract is complete. The records shall contain the name, last known address, telephone number, email address, social security number, correct classification(s) of work actually performed; hourly rates of wages paid, daily and weekly number of hours actually worked, deductions made, and actual wages paid.

1.6.2 The Contractor and its subcontractors shall allow authorized representatives of the Contracting Officer or the Department of Labor to inspect, copy, or transcribe records maintained under paragraph 1.4.1 of this clause. The Contractor or subcontractor also shall allow authorized representatives of the Contracting Officer or Department of Labor to interview employees in the workplace during working hours.

FEDERAL PROVISIONS

The following federal laws and regulations apply to this contract.

EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor

for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontract or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

NONDISCRIMINATION

The Contractor agrees that no person shall be subject to discrimination or denied benefits in connection with the Contractor's performance under this Contract. Accordingly, and to the extent applicable, the Contractor covenants and agrees to comply with the following national policies on discrimination:

(1) On the basis of race, color, or national origin, in Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.), as implemented by Department of Defense (DoD) regulations at 32 CFR part 195.

(2) On the basis of gender, blindness, or visual impairment, in Title IX of the Education Amendments of 1972 (20 U.S.C. 1681 et seq.), as implemented by DoD regulations at 32 CFR part 196.

(3) On the basis of age, in the Age Discrimination Act of 1975 (42 U.S.C. 6101 et seq.), as implemented by Department of Health and Human Services regulations at 45 CFR part 90.

(4) On the basis of disability, in the Rehabilitation Act of 1973 (29 U.S.C. 794), as implemented by Department of Justice regulations at 28 CFR part 41 and DoD regulations at 32 CFR part 56.

(5) On the basis of disability in the Architectural Barriers Act of 1968 (42 U.S.C. 4151 et seq.) related to physically handicapped persons' ready access to, and use of, buildings and

facilities for which federal funds are used in design, construction, or alteration.

LOBBYING

(1) The contractor covenants and agrees to comply with the restrictions on lobbying in 31 U.S.C. 1352, as implemented by DoD at 32 CFR part 28, and submit all disclosures required by that statute and regulation.

(2) The contractor covenants and agrees to comply with the prohibition in 18 U.S.C. 1913 on the use of federal funds, absent express Congressional authorization, to pay directly or indirectly for any service, advertisement or other written matter, telephone communication, or other device intended to influence at any time a Member of Congress or official of any government concerning any legislation, law, policy, appropriation, or ratification.

(3) If the contractor is a nonprofit organization described in section 501(c)(4) of title 26, United States Code (the Internal Revenue Code of 1968), you may not engage in lobbying activities as defined in the Lobbying Disclosure Act of 1995 (2 U.S.C., chapter 26). If we determine that you have engaged in lobbying activities, we will cease all payments to you under this and other contracts and terminate the contracts unilaterally for material failure to comply with the contract terms and conditions.

OFFICIALS NOT TO BENEFIT

The contractor covenants and agrees to comply with the requirements that no member of Congress shall be admitted to any share or part of this contract, or to any benefit arising from it, in accordance with 41 U.S.C. 6306.

HATCH ACT

The contractor agrees to comply with the provisions of the Hatch Act (5 U.S.C. 1501-1508) concerning political activities of certain state and local government employees, as implemented by the Office of Personnel Management at 5 CFR part 151, which limits political activity of employees or officers of state or local governments whose employment is connected to an activity financed in whole or part with federal funds.

DRUG-FREE WORKPLACE

The Contractor covenants and agrees to comply with the requirements regarding drug-free workplace requirements in Subpart B of 2 CFR part 182.

ENVIRONMENTAL PROTECTION

The Contractor covenants and agrees to comply with all following applicable federal environmental laws and regulations. The laws and regulations identified in this section are not intended to be a complete list.

(1) Comply with applicable provisions of the Clean Air Act (42 U.S.C. 7401, et seq.), Federal Water Pollution Control Act (33 U.S.C. 1251-1387, Clean Water Act (33 U.S.C. 1251, et seq.), and standards, orders, or regulations issued under those acts.

(2) Report any violations of the Acts, standards, orders or

regulations to both the award administration office and the appropriate regional office of the EPA.

(3) Comply with applicable provisions of the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846), as implemented by the Department of Housing and Urban Development at 24 CFR part 35. The requirements concern lead-based paint in buildings owned by the Federal Government or housing receiving federal assistance.

(4) Immediately identify to us, any potential impact that you find this contract may have on:

a. The quality of the “human environment”, as defined in 40 CFR 1508.14, including wetlands; and provide any help we may need to comply with the National Environmental Policy Act (NEPA, at 42 U.S.C. 4321 et seq.), the regulations at 40 CFR 1500-1508, and Executive Order 12114, if applicable; and assist us to prepare Environmental Impact Statements or other environmental documentation. In such cases, you may take no action that will have an environmental impact (e.g., physical disturbance of a site such as breaking of ground) or limit the choice of reasonable alternatives to the proposed action until we provide written notification of federal compliance with NEPA or Executive Order 12114.

b. Flood-prone areas and provide any help we may need to comply with the National Flood Insurance Act of 1968, as amended by the Flood Disaster Protection Act of 1973 (42 U.S.C. 4001 et seq.), which require flood insurance, when available, for federally assisted construction or acquisition in flood-prone areas.

c. A land or water use or natural resource of a coastal zone that is part of a federally approved state coastal zone management plan and provide any help we may need to comply with the Coastal Zone Management Act of 1972 (16 U.S.C. 1451, et seq.) including preparation of a Federal agency Coastal Consistency Determination.

d. Coastal barriers along the Atlantic and Gulf coasts and Great Lakes’ shores and provide help we may need to comply with the Coastal Barrier Resources Act (16 U.S.C. 3501 et seq.), concerning preservation of barrier resources.

e. Any existing or proposed component of the National Wild and Scenic Rivers system and provide any help we may need to comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 et seq.).

f. Underground sources of drinking water in areas that have an aquifer that is the sole or principal drinking water source and in wellhead protection areas and provide any help we may need to comply with the Safe Drinking Water Act (42 U.S.C. 300f et seq.).

(5) Comply fully with the Endangered Species Act of 1973, as amended (ESA, at 16 U.S.C. 1531 et seq.) and implementing regulations of the Departments of the Interior (50 CFR parts 10-24) and Commerce (50 CFR parts 217-227). You also must provide any help we may need in complying with the consultation requirements of ESA section 7 (16 U.S.C. 1536) applicable to federal agencies or any regulatory authorization we may need resulting from performance under this contract. This is not in lieu of responsibilities you have to comply with provisions of the Act that apply directly to you as a U.S. entity, independent of receiving this contract.

(6) Comply with the Marine Mammal Protection Act of 1972, as amended (MMPA, at 16 U.S.C. 1361 et seq.) and provide any assistance we may need in obtaining any required MMPA

permit resulting from performance under this contract.

PURCHASE OF RECOVERED MATERIALS

The Contractor agrees to comply with applicable requirements in EPA regulations (40 CFR part 247, Subpart B) which implement section 6002 of the Resource Conservation and Recovery Act of 1976, as amended (42 U.S.C. 6962).

NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION

The Contractor agrees to comply with the requirements of 43 CFR part 10, the Department of the Interior implementation of the Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C., chapter 32), if applicable.

USE OF UNITED STATES FLAG CARRIERS

The Contractor covenants and agrees that travel supported by U. S. Government funds under this agreement shall:

(1) Comply with the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. 40118, also known as the "Fly America" Act), as implemented at 41 CFR 301-10.131 through 301-10.143. The law and regulations provide that U.S. Government-financed international air travel of passengers and transportation of personal effects or property must use a U.S. Flag air carrier or be performed under a cost-sharing arrangement with a U.S. carrier, if such service is available.

(2) Include the requirements of the Fly America Act in all subcontracts that might involve international air transportation.

(3) Comply with the following requirements of the Department of Transportation at 46 CFR 381.7, in regulations implementing the Cargo Preference Act of 1954:

a. Pursuant to Public Law 83-664 (46 U.S.C. 55305), at least 50 percent of any equipment, materials or commodities procured, contracted for, or otherwise obtained with funds under this contract, and which may be transported by ocean vessel, must be transported on privately owned United States flag commercial vessels, if available.

b. Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in section 8.a of this section must be furnished to both our award administrator (through you in the case of your contractor's bill-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

NONPROCUREMENT SUSPENSION AND DEBARMENT

The Contractor is subject to the nonprocurement debarment and suspension regulations. These regulations restrict awards, subawards, and contracts with certain parties that are debarred, suspended, or otherwise excluded from or ineligible for

participation in Federal assistance programs or activities. The Contractor agrees to comply with the DOD implementation of 2 CFR Part 180 (at 2 CFR Part 1125) by checking the Excluded Parties List System (EPLS) at www.sam.gov to verify contractor eligibility to receive contracts and subcontracts resulting from this Agreement. The Contractor shall not solicit offers from, nor award contracts or subcontracts to contractors listed in EPLS. This verification shall be documented in the contractor's contract files and shall be subject to audit by the Federal/State audit agencies.

HISTORIC PRESERVATION

The Contractor agrees to identify to us any:

(1) Property listed or eligible for listing on the National Register of Historic Places that will be affected by this contract, and provide any help we may need, to comply with section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. 306108), as implemented by the Advisory Council on Historic Preservation regulations at 36 CFR part 800 and Executive Order 11593, "Identification and Protection of Historic Properties," [3 CFR, 1971- 1975 Comp., p. 559]. Impacts to historical properties are included in the definition of "human environment" that require impact assessment under NEPA.

(2) Potential for irreparable loss or destruction of significant scientific, prehistorical, historical, or archeological data, and provide any help needed, to comply with the Archaeological and Historic Preservation Act of 1974 (54 U.S.C. chapter 3125).

WHISTLEBLOWER PROTECTIONS

Contractor agrees to comply with 10 U.S.C. 2409, including the:

(1) Prohibition on reprisals against employees disclosing certain types of information to specified persons or bodies.

(2) Requirement to notify your employees in writing, in the predominant native language of the workforce, of their rights and protections under that statute.

PROHIBITION ON CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE SERVICES OR EQUIPMENT

Section 889 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2019 (Public Law 115-232):

(1) Prohibits the head of an executive agency from obligating or expending loan or grant funds to procure or obtain, extend, or renew a contract to procure or obtain, or enter into a contract (or extend or renew a contract) to procure or obtain the equipment, services, or systems prohibited systems as identified in section 889 of the NDAA for FY 2019.

(2) In accordance with 2 CFR 200.216 and 200.471, all awards that are issued on or after August 13, 2020, recipients and subrecipients are prohibited from obligating or expending loan or grant funds to:

a. Procure or obtain;

b. Extend or renew a contract to procure or obtain; or

c. Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, covered

telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities).

i. For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).

ii. Telecommunications or video surveillance services provided by such entities or using such equipment.

iii. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

(3) In implementing the prohibition under Public Law 115-232, section 889, subsection (f), section (1), heads of executive agencies administering loan, grant, or subsidy programs shall prioritize available funding and technical support to assist affected businesses, institutions and organizations as is reasonably necessary for those affected entities to transition from covered communications equipment and services, to procure replacement equipment and services, and to ensure that communications service to users and customers is sustained.

(4) See Public Law 115-232, section 889 for additional information.

(5) Covered Foreign Country means the People's Republic of China.

(6) Telecommunications Cost means the cost of using communication and telephony technologies such as mobile phones, land lines, and internet.

(7) Do Not Contract with the Enemy (2 CFR 183).

TRAFFICKING IN PERSONS

The Contractor agrees to comply with requirements concerning trafficking in persons specified in the award term at 2 CFR 175.15(b), as applicable.

ADDITIONAL REQUIREMENTS

(1) Prohibition on Using Funds under Grants and Cooperative Agreements with Entities that Require Certain Internal Confidentiality Agreements.

(2) You may not require your employees, contractors, or subrecipients seeking to report fraud, waste, or abuse to sign or comply with internal confidentiality agreements or statements prohibiting or otherwise restricting them from lawfully reporting that waste, fraud, or abuse to a designated investigative or law enforcement representative of a federal department or agency authorized to receive such information.

(3) You must notify your employees, contractors, and subrecipients that the prohibitions and restrictions of any internal confidentiality agreements inconsistent with this contract, inclusive of these general terms and conditions are no longer in effect.

(4) The prohibition in paragraph 1.a. of this section does not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a federal department or agency governing the nondisclosure of classified information.

(5) If the Federal Government determines that you are not in compliance with these provisions, it:

a. Will prohibit your use of funds under this contract, in accordance with section 743 of Division E of the Consolidated and Further Continuing Resolution Appropriations Act, 2015, (Public Law 113-235) or any successor provision of law.

b. May pursue other remedies available for your material failure to comply with award terms and conditions.

THE INFRASTRUCTURE INVESTMENT AND JOBS ACT

The Contractor covenants and agrees that it will comply with Pub. L. No. 117-58, which includes the Build America, Buy America Act ("the Act"). Pub. L. No. 117-58, §§ 70901-52. The Act strengthens Made in America Laws and will bolster America's industrial base, protect national security, and support high-paying jobs. The Act requires that the head of each Federal agency shall ensure that "none of the funds made available for a Federal financial assistance program for infrastructure may be obligated for a project unless all of the iron, steel, manufactured products, and construction materials used in the project are produced in the United States."

UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT

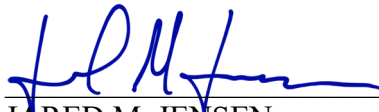
The Contractor covenants and agrees that it will comply with 49 CFR part 24, which implements the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. Section 4601 et seq.) and provides for fair and equitable treatment of persons displaced by federally assisted programs or persons whose property is acquired as a result of such programs.

CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The Contractor covenants and agrees that it will comply with the Contract Work Hours and Safety Standards Act (40 CFR, Subtitle II, Part A, Chapter 37), as implemented by the Department of Labor regulations (29 CFR Part 5). See AGND Document 418, Labor Standards Provisions.

SPECIFICATIONS
FOR
BUILDING IMPROVEMENTS
Bldg. 3480
Camp Gilbert C. Grafton
Devils Lake, North Dakota

I hereby certify that these plans and specifications were prepared by me or under my direct supervision and that I am a duly Registered Professional Architect under the laws of the State of North Dakota.



JARED M. JENSEN
North Dakota Registration No. 2580

Date: 11 August 2026

SHULTZ + ASSOCIATES ARCHITECTS
612 1/2 Main Avenue
Fargo, ND 58103
Telephone: 701-476-0714

.01 SECTION INCLUDES

- a. Project Description.
- b. Construction Schedule.
- c. Scope of Work.
- d. Site Layout and Measurements.
- e. Location of Utilities.
- f. Contractor Coordination.
- g. Public Convenience.
- h. Environmental Management System.

.02 PROJECT DESCRIPTION

- a. Project Name: Building Improvements, Building 3480, Camp Gilbert C. Grafton, Devils Lake, ND
- b. Owner Name: The Adjutant General, State of North Dakota
- c. Architect's Name: Shultz + Associates Architects, Fargo, North Dakota
- d. The Project scope is: Complete Remodel of Building 3480 including: demolition of existing kitchen & cooking areas, dish room, offices, and bathrooms including walls, partial floor removal, doorways, windows, ceiling, plumbing and fixtures, lighting & electrical, and other items; Construction of new classrooms, office areas, and bathrooms with a revised layout and function including new flooring, finishes, tiling, painting, accessories, ceiling work, plumbing, plumbing fixtures, replace mechanical systems; modify BAS controls; electrical system modification including outlets, light fixtures, access control, and light controls; and miscellaneous related work.

.03 CONSTRUCTION SCHEDULE:

- a. All material shall be ordered immediately upon award of respective contracts.
- b. Construction work shall start commensurate with material delivery schedule and shall be diligently pursued to the end that all construction is totally completed on or before **June 25, 2027**. The time stated for completion shall include final cleanup of the premises.

c. The foregoing completion date is based on the assumption that the successful bidders will receive the notice to proceed by **September 30, 2026**. The State will not extend the completion date based on when the Contractor receives the notice to proceed. Also, the completion date will not be extended due to failure of the Contractor to execute the contract and give the required performance and payment bonds and other data required for contract award within the time specified in the bid.

d. NOTE: Contractors must consider that once project construction is initiated after receipt of notice to proceed, all general requirement responsibilities (i.e., project superintendence, contractor coordination, scheduling, utilities, temporary field office facilities/controls, etc.) will continue for the duration of the entire construction period.

e. Scheduled completion date carries a liquidated damages clause (see Article 13 of General Conditions of the Contract for Construction - AIA Document A201). Contractor and subcontractors shall recognize the importance of their responsibilities in completing their work on or ahead of schedule and in strict cooperation with each other.

f. The Contractor shall furnish not less than forty-eight (48) hours notice prior to starting work. Notice shall be furnished to the G9 Director of Installations and Environment – LTC Kristopher Elijah, Fraine Barracks, Bismarck, ND – email: kristopher.p.elijah.mil@army.mil; Telephone: (701) 791-3077 and to Mr. Jared M. Jensen, AIA, Shultz + Associates Architects, 612 1/2 Main Ave, Fargo, ND – email: jared@thearchitectfirm.com; Telephone: (701) 476-0714.

g. In order to complete the work in the stipulated time, the Contractor may elect to work longer than eight (8) hours in any one day, or forty (40) hours in any one (1) week. However, he must notify the Office of the Adjutant General's field representative of his intentions to do so not less than twenty-four (24) hours before the scheduled overtime. The Contractor's Project Superintendent/Foreman MUST BE on the job site supervising ALL scheduled overtime work.

.04 SCOPE OF WORK:

a. Extent of drawings and specifications defining all work to be performed under this contract are listed on cover sheet of specification book. It is the bidding Contractor's sole responsibility to verify that he has received all sheets of plans and specifications as no claim for extra cost will be allowed due to the lack of complete information at the time of bid.

c. Equipment or work indicated on plans to be "By Owner" or "N.I.C." is not to be included in bid proposal or construction contract.

.05 SITE LAYOUT AND MEASUREMENTS:

a. The General Contractor shall be responsible for setting reference points, site layout, construction verification, and establishing building lines, elevations, grading, and utilities. Maintain a complete and accurate log of control and survey work as it progresses.

b. Each Contractor shall, upon entering project site for purposes of beginning work, locate all general reference points and take such action as is necessary to prevent their destruction; lay out his

own work and be responsible for all lines, elevations, and measurements of buildings, grading, utilities, and other work executed by him under contract. Such building lines thus established shall be maintained for use of all Contractors and subcontractors. All Contractors must exercise proper precaution to verify figures shown on drawings before layout work as they will be held responsible for any error resulting from failure to exercise such precaution.

c. Figured dimensions shall be followed in preference to measurements by scale; large scale drawings shall take precedence over those of a small scale. Figures on all drawings, as detail drawings themselves are, in every case, subject to measurements of adjacent or incorporated completed work. All such necessary measurements shall be taken before undertaking any work dependent upon such data. Report any discrepancies to Architect/Engineer for clarification before proceeding with work.

d. Where, on any drawings, a portion of work is drawn out and remainder is indicated in outline, parts drawn out or indicated by symbols or instructions by word description shall apply also to all other like portions of the work.

e. Where existing work is added to or modified, the Contractors shall be responsible to verify existing dimensions and conditions. Any existing condition which affects a Contractor's new work should be verified for accuracy. This includes, but is not limited to, such items as clearances, dimensions, existing equipment, existing services, working conditions, etc.

f. Where a clear understanding of the work is prevented, due to discrepancies, contradictions, or omissions on contract documents or subsequently issued instructions (regardless of source), Contractor shall not proceed with work and Architect/Engineer should be consulted for clarification of the uncertainty. Should any mistake result due to pursuit of work without this clarification, Contractor must make necessary corrections at his expense and as directed by Architect/Engineer.

.06 LOCATION OF UTILITIES:

a. It shall be each Contractor's responsibility to familiarize himself with location of all existing sewer mains, storm mains, water mains, gas mains, telephone cables, cable TV, power lines, street light wiring, and all of their associated service lines, and appurtenances such as poles, guy wires, supports, pads, valve boxes, stop boxes, manholes, and clean-outs pertaining to utility service. Each respective Contractor shall be responsible for notifying North Dakota One-Call at 1-800-795-0555 at least 48 hours before beginning any excavation, excluding Saturdays, Sundays, and holidays, and shall comply with all requirements of Section 49-23 of the North Dakota Century Code. The respective Contractor shall hire a qualified technician to locate those underground utility lines that are not covered by the North Dakota One-Call system. All costs associated with locating all utilities shall be the responsibility of the respective Contractor.

b. Each respective Contractor for the project will be held responsible for damage to any underground or overhead piping, wiring, or other utility property, occurring during any excavation or construction by the respective Contractor or his subcontractors.

.07 CONTRACTOR COORDINATION:

- a. General Contractor shall employ a full-time, on site Project Superintendent(s) who will be responsible for continuous overall coordination between general, mechanical, and electrical phases of work and he shall be the Contractor's liaison with Architect/Engineer and Owner's on site representative. Project Superintendent shall have a minimum of five (5) years' experience in the field, and be approved by the Architect/Engineer and Owner before onset of work. He shall be maintained by the General Contractor throughout the project and not be replaced without approval of the Architect/Engineer and Owner.
- b. Mechanical and Electrical Contractors shall each employ a Project Foreman who will be responsible for continuous coordination with all phases of Contractor work. He shall be the Contractors liaison with Architect/Engineer, Owner's representative, and General Contractor's Project Superintendent. Project Foreman shall have a minimum of five (5) years' experience in the field, and be approved by the Architect/Engineer, and Owner before onset of work. He shall be maintained by the Contractor throughout the project and not be replaced without approval of the Architect/Engineer and Owner. Refer to Divisions 22, 23, 26, 27, and 28 for other required qualifications.
- c. The General Contractor's Project Superintendent(s) responsibilities shall include, but not be limited to:
- (1) Consult the contract drawings and specifications of all trades to verify and coordinate the location of the various building components and items to be installed by all Contractors. Review the daily work schedules of all Contractors for a minimum of interferences to the work of other Contractors. This work includes (but is not limited to) installation of sleeves in wood, masonry, and concrete walls for mechanical and electrical items.
 - (2) Consult and cooperate with all Contractors and their subcontractors/installers for all work to determine space requirements and adequate clearances with respect to other equipment in the building. Architect/Engineer reserves the right to determine space priority in the event of interference between piping, conduit, equipment, furnishings, etc., of various trades.
 - (3) Inspect, report to the Architect/Engineer and coordinate the removal, relocation and reconnection of any installed work which interferes with the work of other trades. All work, as directed, shall be at the expense of the installing Contractor.
 - (4) Hold specific daily coordination meetings for each element of the work, maintain written documentation of events, report to Architect/Engineer at regular (weekly) project meetings.
 - (5) Keep the Architect/Engineer and Owner's Representative fully informed of the progress of the work and endeavor to safeguard the Owner against any defects and deficiencies in all the Work.

- d. The General Contractor will not be responsible for construction means, methods, techniques, procedures, or for safety precautions and programs, or for the safety of workmen of Mechanical and Electrical Contractors in connection with the work, all of which shall be the responsibility of the Mechanical and Electrical Contractors. He will not be responsible for Mechanical and Electrical Contractor's failure to carry out the work in accordance with the contract documents.
- e. General Contractor shall provide lintels, bucks, openings and recesses required for installation of all work unless specified to the contrary. He shall notify the Mechanical and Electrical Contractors of work schedules sufficiently in advance to cooperate with him and be responsible for proper location and sizes of openings required for their work.
- f. Mechanical and Electrical Contractors shall furnish and properly install all bucks, sleeves, conduit hanging devices, backing for hanging devices, etc., pertinent to their work. Failure on part of the Contractors to properly work with General Contractor in providing and placing of openings, recesses, etc., for their work as outlined above will not relieve them of the expense of putting these openings, recesses, etc. in later and repairing such cut construction to the satisfaction of the Architect/Engineer.
- g. Contractors and subcontractors shall:
- (1) Be mutually responsible, one to another, to prevent any delays in construction schedule. No one shall erect any portion of his work where it is necessary that work of others shall be erected first or carried on simultaneously without having first given other superintendents reasonable notice of his intentions.
 - (2) Coordinate scheduling, submittals, and work of the various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
 - (3) Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various contractors, subcontractors, installers and/or suppliers having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
 - (4) Coordinate space requirements and installation of electrical work which is indicated diagrammatically on drawings. Follow routing shown for pipes and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
 - (5) In finished areas (except as otherwise indicated), conceal pipes and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- h. Limitations on site usage as well as specific requirements that impact site utilization are indicated on the drawings and by other contract documents. General Contractor shall administer allocation of available space equally among entities needing both access and space so as to produce

the best overall efficiency in performance of the total work of the project. Each Contractor shall schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site. Architect/Engineer shall be sole judge as to allocation of available space in case of dispute.

.08 PUBLIC CONVENIENCE:

- a. Each Contractor shall, at all times, so conduct his work as to insure the least possible obstruction to traffic and inconvenience to National Guard operational activities, the general public, and the residents in the vicinity of the work, and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the proper authorities. Fire hydrants on or adjacent to the work shall be kept accessible to fire fighting equipment at all times.
- b. The Contractors shall cooperate and coordinate with the Owner in scheduling the work to accommodate National Guard operation and other construction activities occurring simultaneously.

.09 ENVIRONMENTAL MANAGEMENT SYSTEM:

a. The North Dakota National Guard (NDNG) has implemented an environmental Management System (eMS) per guidance published by the Department of Defense. As part of the NDNG's eMS, it shall be the Contractor's responsibility to be informed that some activities associated with certain construction projects may have a significant impact on the environment. Those activities include but are not limited to:

- Fueling Operations
- Dust Control Measures
- Ozone Depleting Chemicals
- Operational Noise

b. It shall be the Contractor's responsibility to familiarize himself with the requirements of the NDNG's plans for the project location.

c. It shall be the Contractor's responsibility to report spills, releases or other environmental issues to the Office of the Adjutant General's field representative upon discovery within a reasonable amount of time (same day/24 hour period). Spills or releases which leave NDNG property must be reported immediately upon discovery.

d. The Contractor will be held responsible for damage to the environment resulting from a spill, release or other environmental violation to include environmental cleanup activities, disposal costs and fines or penalties levied by environmental regulatory agencies.

END OF SECTION 01 1100

.01 SECTION INCLUDES

- a. Procedures for Preparation and Submittal of Bids.
- b. General Information.
- c. Bid Items.

.02 GENERAL INFORMATION:

- a. Bidders may ONLY submit separate bids for General Construction work, Mechanical Construction work, Electrical Construction work; or Total Combined Construction Work. No other types of bids for other portions of the project or combinations of the separate bids will be accepted.
- b. The determination of lowest and best Bidder and respective single contract amount for all work required for each type of bid will be the sum of selected Bid Item(s), and respective Alternates (if any) as determined by the Owner.
- c. Bidders must bid on all Bid Item(s) and Alternates (if any) specified within the type bid being submitted. Bidder may state his refusal to accept award of less than the combination of Bid Item(s) and Alternates (if any) he so stipulates. The submission of a Total Combined Construction Bid (single prime) for the complete project, in compliance with NDCC 48-01.2-06, will not be accepted unless that bid is lower than the combined total of the lowest responsible multiple bids for the project. The Bidder shall make no additional stipulations on the Bid Form nor qualify his bid in any other manner.
- d. In preparing his bid, Bidder is instructed to thoroughly familiarize himself with requirements herein so that his bid will be properly assembled and presented for Owner consideration.
- e. Refer to "Invitation to Bid"; Article 4 of AIA Document A701 regarding procedures for submission of bids.
- f. Prior to the award of the Contract, to enable the Owner to separate costs for funding purposes and as a condition of contract approval, the low bidder(s) may be required to clearly identify cost breakouts of specific items as required by the Owner.

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.03 BID ITEMS AND ALTERNATES:

a. General Construction - Separate Bid for ALL General Work:

BID ITEM NO. G-1:
(Building Improvements –
Base Bid –
General Work)

State the total cost for all work in connection with the complete General Construction of the **Building Improvements – Base Bid – General Work**, as shown on the drawings and as herein specified (Specification Divisions 02 through 12); including all miscellaneous general construction work, and ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this bid item and will NOT include any of the work called for under Alternate Bid Items No. GA-1 and GA-2.

ALTERNATE NO. GA-1:
(Window Replacement)

The following item is NOT part of Bid Item No. G-1. Under this alternate, state the amount to ADDED TO BID ITEM NO. G-1 for all work in connection with the complete General Construction of **Window Replacement**, as shown on the drawings and as herein specified (Specification Divisions 02, and 07 through 9). ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this alternate bid item.

ALTERNATE NO. GA-2:
(Additional Electronic
Door Hardware – General)

The following item is NOT part of Bid Item No. G-1. Under this alternate, state the amount to ADDED TO BID ITEM NO. G-1 for all work in connection with the complete General Construction of **Additional Electronic Door Hardware - General**, as shown on the drawings and as herein specified (Specification Divisions 02 and 08). ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this alternate bid item.

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b. Mechanical Construction - Separate Bid for ALL Mechanical Work:

BID ITEM NO. M-1:
(Building Improvements –
Base Bid –
Mechanical Work)

State the total cost for all work in connection with the complete Mechanical Construction of the **Building Improvements – Base Bid – Mechanical Work**, as shown on the drawings and as herein specified (Specification Division 02, 22, and 23); including all work associated with mechanical construction and ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this bid item.

c. Electrical Construction - Separate Bid for ALL Electrical Work:

BID ITEM NO. E-1:
(Building Improvements –
Base Bid –
Electrical Work)

State the total cost for all work in connection with the complete Electrical Construction of the **Building Improvements – Base Bid – Electrical Work**, as shown on the drawings and as herein specified (Specification Divisions 02 and 26 through 28); including all work associated with electrical construction and ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this bid item and will NOT include any of the work called for under Alternate Bid Item No. EA-1.

ALTERNATE NO. EA-1:
(Additional Electronic
Door Hardware – Electrical)

The following item is NOT part of Bid Item No. E-1. Under this alternate, state the amount to ADDED TO BID ITEM NO. E-1 for all work in connection with the complete Electrical Construction of the of **Additional Electronic Door Hardware - Electrical**, as shown on the drawings and as herein specified (Specification Divisions 02, 08, and 26 through 28). ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this alternate bid item.

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d. Total Combined Construction - Separate Bid for ALL Work Combined Single Prime:

BID ITEM NO. TC-1:
(Building Improvements –
Base Bid –
Total Combined General,
Mechanical, and
Electric Work)

This bid item is the same scope as bid items G-1, M-1, and E-1 Combined. State the total cost for all work in connection with the complete Total Combined Construction of the **Building Improvements – Base Bid – Total Combined General, Mechanical, and Electric Work**, as shown on the drawings and as herein specified (Specification Divisions 02 through 28); including all miscellaneous general, mechanical, and electrical construction work, and ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this bid item and will NOT include any of the work called for under Bid Item TC-2 nor Alternate Bid Items No. TCA-1 through TCA-5.

ALTERNATE NO. TCA-1:
(Window Replacement)

The following item is NOT part of Bid Item No. TC-1. This bid item is the same scope as alternate bid item GA-1. Under this alternate, state the amount to ADDED TO BID ITEM NO. TC-1 for all work in connection with the complete Total Combined Construction of the **Window Replacement**, as shown on the drawings and as herein specified (Specification Divisions 02, and 07 through 9). ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this alternate bid item. .

ALTERNATE NO. TCA-2:
(Additional Electronic
Door Hardware – Total
Combined General and
Electric Work)

The following item is NOT part of Bid Item No. TC-1. This bid item is the same scope as alternate bid items GA-2 and EA-1 Combined. Under this alternate, state the amount to ADDED TO BID ITEM NO. TC-1 for all work in connection with the complete Total Combined Construction of the **Additional Electronic Door Hardware**, as shown on the drawings and as herein specified (Specification Divisions 02, 08, and 26 through 28). ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this alternate bid item.

.01 SECTION INCLUDES

- a. Preconstruction Meeting.
- b. Construction Progress Schedule.
- c. Progress Meetings.
- d. ASTM Designations.
- e. Terminology.
- f. Submittals Overview.
- g. Identification of Submittals.
- h. Coordination of Submittals.
- i. Timing of Submittals.
- j. Number of Copies of Submittals.
- k. Shop Drawings.
- l. Building Permit.
- m. Builder's Risk Insurance.

.02 PRE-CONSTRUCTION MEETING:

After date of notice to proceed, and upon coordination with all parties, the Architect/Engineer/Owner shall call a pre-construction meeting. Required in attendance shall be Architect/Engineer, Owner's representative(s), Contractors, and the Superintendent/Foremen together with the major subcontractors and suppliers. The general purpose of meeting will be to: review contract documents; review Owner procedures, documentation requirements, and general project overview agenda; procedures for processing of subcontractors approval, product approval, schedule of values and progress schedule; designation of personnel representing the Architect/Engineer, Owner, and Contractor; procedures for processing field decisions, submittals, applications for payment, proposal requests and change orders; coordinate temporary facilities and controls; and discuss any other items of concern which relate to the Work.

.03 CONSTRUCTION PROGRESS SCHEDULE.

- a. The General Contractor shall, upon conferring with the Mechanical and Electrical Contractors and subcontractors, prepare and submit to the Architect/Engineer, within ten (10) days of contract award, five (5) copies of the proposed construction progress schedule for approval, all in accordance with Para. 3.10, Article 3 of General Conditions of the Contract for Construction (AIA Document

A201). Upon written approval of the proposed schedule by all parties concerned (i.e., Architect/Engineer, Owner, and Mechanical and Electrical Contractors, the General Contractor shall furnish three (3) copies to Mechanical and Electrical Contractors, and one (1) copy each to its testing company and general subcontractors. Mechanical and Electrical Contractors shall furnish one (1) copy to their testing company and subcontractors. This shall serve as advance notice for their scheduling of materials, deliveries and installations to conform with the overall construction network plan.

- (1) The construction schedule shall consist of a bar chart showing the order and interdependence of activities and the sequence in which the work is to be accomplished as agreed to by ALL Contractors. The project completion date (**June 25, 2027**) WILL BE shown on the chart as the latest completion date of ALL activities.
- (2) The bar chart shall be scaled using units of approximately one-half inch equals one week or other suitable scale approved by Architect/Engineer. Weekends and holidays shall be indicated. The chart shall show the principal categories of work corresponding with those used in the breakdown on which the progress payments are based.
- (3) The chart shall indicate ALL key building phases (i.e., completion dates of Owner construction sequence items, sitework, building completely enclosed, delivery and installation of key items of equipment, etc.) to include other phases and sequences as required by Architect/Engineer and Owner.

.04 PROGRESS MEETINGS

a. The General Contractor's Project Superintendent shall coordinate all arrangements for project progress meetings which shall be held at maximum weekly. Attendance shall include Architect/Engineer, Owner's Representative(s), Mechanical and Electrical Contractors, and the Superintendents/Foremen. All subcontractors and suppliers involved in current major phases of work shall also be in attendance.

- (1) The General Contractor's Project Superintendent shall, after consultation with Architect/Engineer, Owner's Representative and other Prime Contractors, prepare and furnish agenda with copies for participants.
- (2) The Architect/Engineer shall preside at the meetings, record minutes, and distribute copies within two (2) working days to Engineers, Owner, Prime Contractors, and Project Superintendent. It shall be each Contractors responsibility to immediately distribute copies to respective subcontractors, suppliers and installers who were participants and/or affected by the decisions made
- (3) The general purpose of the progress meeting shall be to: review previous meeting minutes; review work progress as it relates to each entities present and future needs including interface requirements; identify problems which are or may impede planned progress; review submittal schedules, delivery schedules, site access and utilization, temporary facilities and controls and progress cleaning requirements; review of

progress schedule and determination of corrective measures to regain projected schedule to include firm commitments from responsible entities; review and coordinate planned progress for succeeding work period; review and coordinate change orders; update progress schedule as required; and conduct any other business relating to the Work.

- (4) Immediately following the progress meeting, the Project Superintendent shall review and coordinate all items listed in the minutes.
- (5) When revisions to project schedule have been made, to include all necessary approvals, the General Contractor shall reissue revised schedules in accordance with previous paragraph .03.a.

.05 ASTM DESIGNATIONS:

Shall be latest edition for all sections of specifications. Materials specified to comply to a certain standard (ASTM or other) shall be delivered to job properly labeled and identified. If material is not labeled, Contractor shall furnish a certificate of compliance from manufacturer.

.06 TERMINOLOGY:

- a. Requirements of all Specification Sections A through J and Division 01 extend and apply to all work required of Contractors, subcontractors, material suppliers, etc., set forth in other divisions of the specifications.
- b. Where the term “include” is used under Scope of Work paragraphs of subsequent specification sections, this shall be interpreted to mean items of work therein listed may be a part, but not necessarily the total limit, of the work required by such section. Contractor shall examine drawings and specification documents.
- c. 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” or “as shown on Drawings” is intentional. The words “shall” or “shall be” are to be supplied by inference. The term “provide” shall mean “furnish and install in place”.
- d. 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.

.07 SUBMITTALS OVERVIEW:

- a. Wherever possible throughout the contract documents, the minimum acceptable quality of workmanship and material has been defined by manufacturer’s name and catalog number or by reference to recognized industry standards.
- b. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for its review and approval or rejection by the Architect/Engineer.

c. Related Work Described Elsewhere:

- (1) Contractual requirements for submittals: General Conditions of the Contract for Construction (AIA Document A201).
- (2) Individual submittals required: Pertinent sections of these specifications.

.08 IDENTIFICATION OF SUBMITTALS:

Completely identify each submittal and resubmittal by showing at least the following information:

- a. Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
- b. Name of project as it appears on each page of these Specifications.
- c. Pertinent drawing sheet and detail number(s), and specification section number, as appropriate, to which the submittal applies.
- d. Whether this is an original submittal or resubmittal.

.09 COORDINATION OF SUBMITTALS:

a. General: Prior to submittal for Architect/Engineer's review, use all means necessary to fully coordinate all materials, including the following procedures:

- (1) Determine and verify all field dimensions and conditions, materials, catalog number and similar data.
 - (2) Coordinate, as required, with all trades and with all public agencies involved. Secure all necessary approvals from public agencies and others and signify by stamp, or other means, that they have been secured.
 - (3) Clearly indicate all deviations from the Contract Documents.
- b. Grouping of Submittals: Unless otherwise specifically permitted by the Architect/Engineer, make all submittals in groups containing all associated items; the Architect/Engineer may reject partial submittals as not complying with the provisions of the Contract Documents.
- c. Prior to submittal, Contractor shall apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
- d. Provide space for Contractor, Architect/Engineer and Owner review stamps.

- e. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- f. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

.10 TIMING OF SUBMITTALS:

- a. General:
 - (1) Make all submittals far enough in advance of scheduled dates of installation to provide all required time for review, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.
 - (2) In scheduling, allow at least ten (10) full working days for the Architect/Engineer's review following his receipt of the submittal.
- b. Delays: Costs of delays occasioned by tardiness of submittals may be back charged to the Contractor and shall not be borne by the Owner.

.11 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.

.12 SHOP DRAWINGS:

- a. Unless otherwise specifically directed by the Architect/Engineer, submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the contract documents. Do not reproduce contract documents or copy standard information as the basis of shop drawings. Standard information prepared without specific reference to the project is not a shop drawing. Contractor shall indicate on the shop drawing submittal that they have reviewed and approved it prior to forwarding it to the Architect/Engineer for review.
- b. Shop drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
 - (1) Dimensions.
 - (2) Identification of products and materials included by sheet and detail number.

- (3) Compliance with specified standards.
 - (4) Notation of coordination requirements.
 - (5) Notation of dimensions established by field measurement.
- c. Type of Prints Required: Unless otherwise specifically directed by the Architect/Engineer, submit all shop drawings in electronic PDF format.
- d. Distribution: After review and approval by Architect/Engineer, Contractor shall provide and distribute all copies required for this purpose and as required by subcontractors, suppliers, manufacturers, installers, etc.

.13 BUILDING PERMIT:

- a. A building permit is not required for this project. All other fees, permits, licenses, bonds, etc., are the individual responsibility of the respective Contractors in accordance with other pertinent sections of these specifications and should be included in their bids.
- b. This facility is subject to inspection by state building code officials. Any costs that will be incurred by the Contractor for inspections by state building code officials shall be included in that Contractor's bid.

.14 BUILDER'S RISK INSURANCE

The General Contractor shall arrange and pay any cost associated with builder's risk insurance for the total project in accordance with AIA Document A101 - 2017 Exhibit A. The General Contractor shall include in their bid Builder's Risk insurance costs for the value of the General Construction work only. This insurance will include the Owner (The Adjutant General, State of ND) as Additional Insured. Upon determination of the total actual construction cost after all contracts have been awarded, the additional Builder's Risk policy costs for the other categories of work (Mechanical and Electrical) shall be credited to the General Contractor by Change Order, accordingly. The Total Combined Construction Contractor shall include in their bid Builder's Risk insurance costs for the value of their bid. All other insurance requirements are the responsibility of the respective Contractors in accordance with AIA Document A101 - 2017 Exhibit A and should be factored into their base bid.

END OF SECTION 01 3000

.01 SECTION INCLUDES

- a. Scope of Work.
- b. Approved Testing Laboratories.
- c. Testing Laboratory Requirements.
- d. Payment for Testing Services.
- e. Taking Specimens.
- f. Schedules for Testing.
- g. Code Compliance Testing.
- h. Contractor's Convenience Testing.
- i. Individual Testing Procedures and Requirements

.02 SCOPE OF WORK:

- a. Extent of work of this section includes all labor, material, equipment, and services necessary for and reasonably incidental to the testing of material as shown on the drawings and specified herein.
- b. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.
- c. The Testing Laboratory shall be retained by the Contractor, at no additional expense to the Owner. The Testing Laboratory shall act as the Owner's agent in all matters relating to material testing, and shall report to the Owner and take instructions from the Contractor after Owner and Engineer approval of instructions has been granted.
- d. It shall be the responsibility of all Contractors to familiarize themselves with all sections of these specifications to allow the Testing Laboratory to perform their duties at the proper sequence of construction without any hindrance or delays.
- e. Additional requirements for testing are described in various sections of these specifications.
- f. General, Mechanical, and Electrical Contractors shall EACH be responsible for retaining a prior approved single testing laboratory to perform all services for their respective work responsibility under this section.

g. NOTE: The quality control testing required on this project is a significant part of the overall project. Bidder is CAUTIONED to thoroughly familiarize himself with the testing requirements and the costs to provide them.

.03 APPROVED TESTING LABORATORIES:

The following laboratories are approved: American Engineering Testing, Inc. – AET; Braun Intertec Testing Services, Inc.; Geoserve, Inc.; Materials Testing Services, Inc.; Terracon; and Veteran Testing and Inspecting, LLC – VTI.

.04 TESTING LABORATORY REQUIREMENTS:

- a. Each person in charge of laboratory testing, field testing, and inspection must have not less than one (1) year of full-time experience in the duties required to be performed under this Contract and shall perform such duties only under the direct supervision of a registered engineer.
- b. The Testing Laboratory shall perform all tests described herein and any additional tests requested by Owner. When it appears that the material furnished, or work performed by the Contractor, fails to meet the construction contract requirements, the Testing Laboratory shall direct the attention of the Owner and Engineers to such failure.
- c. Meetings: Representatives of the **Testing Laboratory shall** attend pre-construction conferences and all project progress meetings when so directed by Owner, Engineers and/or Contractor, at no additional cost to the Owner.
- d. Written Reports: Submit all test reports to Owner, Engineer (if applicable), Contractor and respective subcontractor (if applicable) within seventy-two (72) hours after each test is completed unless specified otherwise in these specifications.
- e. Verbal Reports: Testing Laboratory is to give verbal notification, to Owner and Engineers, immediately, of any irregularity to ensure all necessary retesting and/or replacement of material with the least possible delay in progress of the Work.
- f. The testing requirements shall remain in force for the full duration of the construction contract, including all delays or time extensions.

.05 PAYMENT FOR TESTING SERVICES:

- a. Initial Services:
 - (1) The Contractor will pay for all initial testing services requested by these specifications. Costs for all such testing services shall be included in Contractor's proposal.
 - (2) The Contractor will pay for all initial testing services requested by the Owner which are not specifically required by these specifications, and upon completion and acceptance of all work, an equitable adjustment shall be effected thereof by

appropriate Change Order in accordance with paragraph 7.2.2 of General Conditions of the Contract for Construction (AIA Documents A201) EXCEPT that, if such initial tests indicate noncompliance with the Contract Documents, the costs of initial tests associated with that noncompliance shall be borne entirely by the Contractor.

- b. Retesting: When initial tests indicate noncompliance with the Contract Documents, all subsequent retesting occasioned by the noncompliance shall be performed by the same Testing Laboratory and the costs thereof will be borne entirely by the Contractor.

.06 TAKING SPECIMENS:

- a. All specimens and samples for testing will be taken only by the Testing Laboratory; all sampling equipment and personnel will be provided by the Testing Laboratory; and all deliveries of specimens and samples to the Testing Laboratory will be performed only by the Testing Laboratory.
- b. Contractor shall provide representatives of the Testing Laboratory access to the work at all times in order that the Laboratory may properly perform its functions.

.07 SCHEDULES FOR TESTING:

- a. Establishing Schedule: By advance discussion with the Testing Laboratory, the Contractor shall determine the time required for the Laboratory to perform its tests and to issue each of its findings.
- b. When changes of construction schedule are necessary during construction, the Contractor shall coordinate all such changes of schedule with the Testing Laboratory.
- c. When the Testing Laboratory is ready to test specimens but cannot due to incompleteness of the work, all extra costs for testing attributable to the delay will be back charged to the Contractor and shall not be borne by the Owner.

.08 CODE COMPLIANCE TESTING:

Inspections and tests required by codes or ordinances, or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

.09 CONTRACTOR'S CONVENIENCE TESTING:

Inspection or testing performed exclusively for Contractor's convenience shall be the sole responsibility of the Contractor.

.10 CAST-IN-PLACE CONCRETE:

- a. See Specification Section 03 3000.

- b. The Testing Laboratory shall prepare the concrete mix design for each type of concrete used on the job.
- c. The Testing Laboratory shall perform batch plant inspections to verify that the ready mix producer is in compliance with the requirements as established by the National Ready Mix Concrete Association for Batch Plant Certification, and until concrete quality is established to the satisfaction of the Owner and Architect/Engineer. Periodic inspections shall be performed thereafter as determined by the Testing Laboratory and with the concurrence of the Owner and Architect/Engineer. Periodically inspect and test batch proportioning equipment for accuracy.
- d. The Testing Laboratory shall run a laboratory trial batch mix for each type of concrete proposed for use on the site to determine proper mix proportions, to include gradation and quality of coarse and fine aggregates.
- e. The Testing Laboratory shall sample and test aggregates and mix ingredients as necessary to insure compliance with specifications.
- f. The Testing Laboratory shall sample and test aggregates as necessary for moisture content. Request that adjustments be made in quantities of mixing water and aggregates as necessary to maintain water-cement ratio of approved design mixes.
- g. The Testing Laboratory shall certify, in duplicate, that ingredients and proportions and amount of ingredients in concrete conform with approved trial mixes. When concrete is batched or mixed off immediate building site, the Ready-Mix supplier shall certify (by signing, initialing, or stamping thereon) on delivery slips (duplicate) that ingredients in truck load mixes conform to proportions of aggregate weight, cement factor and water-cement ratio of approved trial mixes.
- h. The Testing Laboratory shall:
 - (1) Provide a field representative at site during placement of concrete to perform concrete sampling and testing.
 - (2) Take concrete samplings in accordance with ASTM C172. Mold and cure three compression test cylinders for each 100 cubic yards or fraction thereof for each concrete type per day. Label each cylinder with an identification number. Owner may require additional cylinders to be molded and cured under job conditions.
 - (3) Test slump of concrete periodically and during making of concrete test cylinders. Method of making slump test shall be described in ASTM C143.
 - (4) When air-entrained concrete is being placed, determine air content at least daily during progress of such work and during making of concrete test cylinders. Determine air content by either ASTM C173 or ASTM C231.
 - (5) If slump of air content falls outside specified limits, another test shall be made immediately from another portion of same batch.

- (6) Insure maintenance of water-cement ratio established by approved trial mix.
 - (7) Notify batch plant of mix irregularities and request materials and proportioning check.
 - (8) Verify that specified mixing has been accomplished.
- i. Laboratory Tests of Field Samples:
- (1) Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one (1) cylinder at seven (7) days and one (1) cylinder at twenty eight (28) days. The remaining cylinder will be used as a spare to be tested at either 7, 14, 28, 56 or 90 day test as required. No further compression tests on each test series are required after specified strengths have been met.
 - (2) Furnish compression test reports in accordance with paragraph .03d. On test reports indicate following information:
 - (a) Cylinder identification number and date cast.
 - (b) Specific location at which test samples were taken.
 - (c) Type of concrete, slump and percent air.
 - (d) Compressive strength of concrete in psi.
 - (e) Weather conditions during placing.
 - (f) Temperature of concrete.
 - (g) Maximum and minimum ambient temperature during placing.
 - (h) Ambient temperature when concrete sample in test cylinder was taken.
 - (i) Date delivered to laboratory and date tested.

.11 DIAMOND POLISHING CONCRETE FLOORS:

- a. See Specification Section 03 3543.
- b. Submit certified written reports in accordance with paragraph .03d.

END OF SECTION 01 4000

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.01 SECTION INCLUDES

- a. Scope of Work.
- b. Job Conditions.
- c. Temporary Utilities.
- d. Field Office and Storage.
- e. Temporary Sanitary Facilities.
- f. Enclosures.
- g. Access Roads and Parking Areas.
- h. Waste Removal.
- i. Maintenance and Removal.
- j. Land and Rights-of-Way.

.02 SCOPE OF WORK:

- a. Work Included: Temporary facilities and controls required for this Work include, but are not necessarily limited to:
 - (1) Temporary utilities such as heat, water, lighting and power and telephone.
 - (2) Field office and storage sheds.
 - (3) Sanitary facilities.
 - (4) Enclosures such as tarpaulins, barricades and canopies.
 - (5) Access roads and parking areas.
- b. Except that all equipment furnished by subcontractors shall comply with all requirements of pertinent safety regulations, the ladders, planks, hoists, and similar items normally furnished by the individual trades in execution of their own portions of the Work are not part of this section.
- c. Permanent installation and hook-up of the various utility lines are described in the pertinent other sections of these specifications.
- d. Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

.03 JOB CONDITIONS:

Make all required connections to existing utility systems with minimum disruption to the existing utility systems. When disruption of the existing service is required, do not proceed without the Architect/Engineer's or Owner's authorized representative's approval and, when required, provide alternate temporary service(s) at no additional cost to the Owner.

.04 TEMPORARY UTILITIES:

a. General:

- (1) All temporary facilities shall be subject to the Owner Representative's approval and shall be confined to areas authorized or approved by Owner Representative or Owner. The Contractor shall hold and save the Owner, its officers, and agents, free and harmless from liability of any nature occasioned by his temporary facilities.
- (2) When Architect/Engineer certifies that total project is substantially completed and ready for occupancy, Owner shall assume all respective expenses for utilities (i.e., water, lighting & power, and heating), including protection and operating of such systems, from date of substantial completion. NOTE: General Contractor MUST CONSIDER that his responsibility for temporary utilities WILL BE required until the project completion date as specified in Specification Section 01100 "Summary of Work." If total project is NOT substantially completed and ready for Owner occupancy by stated completion date, all responsibilities for temporary utilities will continue as specified until substantial completion. Occupancy determination will also be dependent upon completion of all exterior site items so as to allow functional access to the entire site for the Owner's operational activities intended.

b. Water:

- (1) The Mechanical Contractor shall furnish and install a single temporary water supply source, to include 400 lineal feet of branch piping with three outlets located so water is available by hoses with threaded connections, from new construction service to building as soon as possible and remove same when no longer needed (cost of work shall be borne by Mechanical Contractor). Hoses for water distribution around building will be furnished by respective Contractors requiring same. Cost of water used for this service is to be borne by General Contractor.
- (2) Until above service is provided, water for construction purposes will not be available at the construction site. General Contractor shall provide all water required and in a manner of his own choosing all at his cost

c. Light & Power:

- (1) General Contractor shall arrange with local power supplier and pay for all temporary electricity required by ALL Contractors for light and power during construction operations. General Contractor shall arrange to run in necessary temporary, secondary

service(s) to a pole(s) location(s) on the construction site as approved by the Architect/Engineer. Costs of this service and work will be borne by the General Contractor. NOTE: General Contractor shall coordinate with Electrical Contractor in determining type and size of temporary secondary service required.

- (2) The Electrical Contractor shall provide weatherproof, grounded power distribution system with ground fault protection sufficient to accommodate ALL construction operations requiring power until adequate power can be provided from permanent wiring devices (coordinate with ALL Contractors). Outlets for power tools, etc., shall be on a 100' grid within the structure (minimum of two (2) 120 volt duplex receptacles per location). Receptacles for welding shall be on a 200' grid within the structure (minimum of one (1) 30 amp. 208 or 240 volt, single phase receptacle per location).
- (3) The Electrical Contractor shall furnish and maintain adequate lighting conditions to accommodate ALL construction operations (minimum of 20 foot candles per room) until permanent fixtures are installed (coordinate with ALL Contractors). Lighting circuits shall be separate from power circuits.
- (4) Task lighting, wiring, devices, etc., shall be provided by respective Contractor requiring same.
- (5) Architect/Engineer shall be sole judge of amount of temporary wiring or lamps needed in case of dispute.
- (6) The General Contractor shall furnish and maintain a separate power service for all heating devices.

d. Telephone:

- (1) General, Mechanical, and Electrical Contractors shall provide separate temporary telephones during construction period, to be located in respective temporary field offices and elsewhere within the area as required by Owner Representative. Cell Phones are acceptable.

e. Heat:

- (1) The use of permanent heating system to include any portion thereof is permitted as specifically agreed to in writing by Owner, Architect, Mechanical Engineer, General Contractor, Mechanical Contractor, and Electrical Contractor. NOTE: Specific conditions regarding protection, maintenance, adjustment, service, filter replacement, cleaning, and warranty will be addressed in this written agreement.
- (2) The General Contractor shall be responsible for providing all heat sufficient to protect all work and materials prior to Owner's acceptance of Work. A minimum temperature of 50 degrees F. shall be maintained in spaces (construction shelters, building enclosures, etc.) involved at all times during placing, setting and curing of concrete and masonry materials. For a period of at least two (2) weeks prior to installation of

millwork items and other interior finishing, floor covering and painting work, and continuously thereafter until acceptance of building by Owner, a minimum temperature of 65 degrees F. shall be maintained throughout entire building (see individual specification section for additional heating requirements). These temperature levels shall be monitored by a minimum of one (1) thermostat per 4,000 sq. ft. Under no conditions shall temperatures of enclosed units of construction be allowed to be less than 50 degrees F., whether or not any construction operations are being performed in those areas; and it will be the responsibility of the General Contractor to furnish all heating devices to maintain these temperatures.

- (3) The General Contractor shall furnish, place, connect and ventilate all temporary heating devices required to maintain a uniform tempered construction environment. Cost of service for lines and for fuel and power used for this service is to be borne by General Contractor.
 - (4) Gas: Mechanical Contractor shall furnish and install a single temporary gas connection from service to building as soon as possible and remove same when no longer needed (cost of work shall be borne by Mechanical contractor). General Contractor shall furnish and install all temporary piping for temporary heat. Cost of natural gas used for temporary heating is to be borne by General Contractor.
 - (5) All temporary heating devices in or adjacent to the building are subject to Architect/Engineer's approval. Portable units must be vented. Smokeless units must be provided at times and locations necessary to prevent smoke damage or stains to building or materials. Temporary devices used inside building, when fully or partially enclosed, shall be acceptable smokeless and vented natural gas fired or electric heaters with motor-driven fan. Use of propane fired devices is prohibited.
 - (6) Remove any and all non-permanent heating devices, etc., used for temporary heat when they are no longer needed.
 - (7) Architect/Engineer shall be sole judge as to amount of temporary heat and enclosures needed in case of dispute. The General Contractor must provide adequate personnel and mechanical surveillance of heating devices to prevent over or under heating whenever heating devices are in operation.
- f. Ventilation: The General Contractor shall provide and maintain all ventilation necessary in enclosed areas to assist cure of materials, to dissipate humidity and to prevent accumulation of dust, fumes, vapors, or gasses. All costs for these services shall be borne by the General Contractor.

.05 FIELD OFFICE AND STORAGE:

- a. Temporary field office trailers/buildings are not a requirement for this project, however the Owner has no objection to Contractors providing and maintaining such offices on the building site. Expenses for all utilities, services, equipment and furnishings for each temporary field office shall be the responsibility of the respective Contractor.

- b. Each Contractor shall provide storage buildings as required for storage of materials requiring protection from elements. Remove same when work is complete.
- c. Subcontractors shall provide storage buildings for their own use on job, or shall arrange, at their expense, with the respective Contractor to provide such space for them. Such storage structures shall be removed when construction is complete.

.06 TEMPORARY SANITARY FACILITIES:

- a. General Contractor shall provide and maintain field toilet(s) as necessary for use of all workers and in sufficient numbers for each sex. These shall be located where expedient and maintained in strict sanitary condition.
- b. Remove all temporary toilet facilities when they are no longer needed. Permanent fixtures may not be used by construction personnel without Architect/Engineer and Owner approval.

.07 ENCLOSURES:

Furnish, install and maintain for the duration of construction all required scaffolds, tarpaulins, barricades, canopies, warning signs, steps, bridges, platforms, safety nets and all other temporary construction or devices necessary for proper completion of the Work in compliance with all safety and other regulations.

.08 ACCESS ROADS AND PARKING AREAS:

- a. The General Contractor, in strict accordance with all regulations governing use of site, will provide and maintain access to the work site.
- b. The General Contractor shall provide and maintain access to the building by placing sufficient gravel (minimum 4 inches) over the access to this area to allow for all-weather uninterrupted use, to include snow removal.

.09 WASTE REMOVAL

Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

.10 MAINTENANCE AND REMOVAL:

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect/Engineer. Restore permanent facilities used during construction to specified condition.

.11 LAND AND RIGHTS-OF-WAY:

The Owner shall furnish all land and rights-of-way required for completion of all construction under this Contract. The Contractor shall not enter onto private property during the completion of this Contract. If the Contractor requires additional area over and above the rights-of-way and easements as shown on the plans, he shall make these arrangements at his own expense. If such additional areas are acquired by the Contractor for his use, the Owner will in no way be responsible for any accidents or claims arising out of such arrangement.

END OF SECTION 01 5000

.01 SECTION INCLUDES

- a. Scope of Work.
- b. Product Handling.
- c. Substitutions.
- d. Samples.
- e. Colors.
- f. Maintenance Materials, Including Extra Materials, Spare Parts, Tools, and Software.
- g. Product Warranties.

.02 SCOPE OF WORK:

- a. Wherever possible throughout the contract documents, the minimum acceptable quality of workmanship and material has been defined by manufacturer's name and catalog number or by reference to recognized industry standards.
- b. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for its review and approval or rejection by the Architect/Engineer.
- c. Related Work Described Elsewhere:
 - (1) Contractual requirements for submittals: General Conditions of the Contract for Construction (AIA Document A201).
 - (2) Individual submittals required: Pertinent sections of these specifications.

.03 PRODUCT HANDLING:

Make all submittals of Shop Drawings, samples, requests for substitutions, and other items in strict accordance with the provisions of this section of these specifications.

.04 SUBSTITUTIONS:

- a. Prior Approval Required:
 - (1) The Contract is based on the material and methods described in the Contract Documents. The material and products described in the bidding documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

- (2) No substitution will be considered unless written request for approval has been received by the Architect/Engineer at least **ten (10) days** prior to the date of receipt of Bids. Such requests shall include the name of the material for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials or other portions of the work including changes in the work of other contracts that incorporation of the proposed substitution would require shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect/Engineer's decision of approval or disapproval of a proposed substitution shall be final.
 - (3) Those requesting Architect/Engineer consideration of their products "equals" shall make such request in electronic PDF format providing space for Architect/Engineer approval and/or comments on each item requested. An electronic PDF copy of the request form, with Architect/Engineer action on same, will be returned to the proposer.
 - (4) If the Architect/Engineer approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.
 - (5) No substitutions will be considered after the Contract award unless specifically provided in the Contract Documents. Under no condition shall Bids be submitted on work or materials not approved by the Architect/Engineer for this specific project, even though approval might have been given on other projects previously.
- b. Or Equal:
- (1) Where the phrase "or equal" or "or approved equal" or "or equal as approved by the Architect/Engineer" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved as equal by the Architect/Engineer unless the item has been specifically approved for this work by the Architect/Engineer in electronic PDF format prior to receipt of Bids by Addendum, all in accordance with procedure outlined in above paragraph .04a "Prior Approval Required".
 - (2) The decision of the Architect/Engineer shall be final.
- c. Availability of Specified Items:
- (1) Verify, prior to bidding, that all specified items will be available in time for installation during orderly and timely progress of the work.
 - (2) In the event specified item or items will not be available, so notify the Architect/Engineer prior to receipt of bids.
 - (3) Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be back charged as necessary and shall not be borne by the Owner.

.05 SAMPLES:

- a. Accuracy of Sample: Unless otherwise specifically directed by the Architect/Engineer, all samples shall be of the precise article proposed to be furnished and shall illustrate the functional and aesthetic characteristics of the product.
- b. Number of Samples Required: Submit all samples in the quantity which is required to be returned plus three (3) which will be retained by the Architect/Engineer.

.06 COLORS:

- a. General: Unless the precise color and pattern is specifically described in the Contract Documents, whenever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts from the full range of manufacturer's standards to the Architect/Engineer for his review and selection.
- b. Comparative Analysis: Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited for the installation, completely describe the relative costs and capabilities of each.

.07 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.

.08 PRODUCT WARRANTIES:

- a. The date of Substantial Completion of the project is also date of commencement of applicable warranties required by contract documents.
- b. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.
- c. Submit warranty information. See Specification Section 01 7800.

END OF SECTION 01 6000

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.01 SECTION INCLUDES

- a. Scope of Work.
- b. Cutting and Patching.
- c. Protection of Installed Work.
- d. Workmanship.
- e. Starting of Systems and Equipment.
- f. General Operating and Maintenance Instruction.
- g. Cleaning Materials and Equipment.
- h. Progress Cleaning and Protection.
- i. Final Cleaning and Protection.
- j. Closeout Description.
- k. Closeout Procedures.
- l. Final Payment.

.02 SCOPE OF WORK:

- a. Throughout the construction period, maintain the site in a standard of cleanliness as described in this Section.
- b. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other sections of these specifications.
- c. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- d. Prior to requesting inspection by the Architect/Engineer, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

.03 CUTTING AND PATCHING:

- a. Contractors shall be responsible to 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.

- b. Whenever possible, execute the work by methods that avoid cutting or patching.
- c. 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.
- d. 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 electrical and other services.
 - (4) Match work that has been cut to adjacent work.
 - (5) Repair areas adjacent to cuts to required condition.
 - (6) Repair new work damaged by subsequent work.
 - (7) Remove samples of installed work for testing when requested.
 - (8) Remove and replace defective and non-complying work.
- e. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- f. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- g. Restore work with new products in accordance with requirements of Contract Documents.
- h. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- i. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material to full thickness of the penetrated element.
- j. Patching:
 - (1) Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
 - (2) 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.

- (3) Match color, texture, and appearance.
- (4) 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.

.04 PROTECTION OF INSTALLED WORK:

- a. Contractors shall be responsible to Protect installed work from damage by construction operations.
 - (1) Provide special protection where specified in individual specification sections.
 - (2) Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
 - (3) Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
 - (4) Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
 - (5) 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.
 - (6) Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

.05 WORKMANSHIP:

- a. Manufacturer's printed instructions covering details of installation shall be followed where not in conflict with these specifications. If there is a conflict, notify the Architect/Engineer and obtain his approval before proceeding.
- b. Completed work shall be left plumb, level, true to line or plane, anchored securely in place, and free from damage.
- c. 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.
- d. Except where in conflict with these specifications, current manufacturers' printed specifications of herein specified proprietary products are made part of these specifications.

.06 STARTING OF SYSTEMS AND EQUIPMENT

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

- b. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- c. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- d. Verify that wiring and support components for equipment are complete and tested.
- e. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- f. Submit a written report that equipment or system has been properly installed and is functioning correctly.

.07 GENERAL OPERATING AND MAINTENANCE INSTRUCTION:

- a. Respective Contractors shall arrange for each installer of operating equipment and other work that requires operational instruction and/or regular or continuing maintenance, to meet at the site with the Owner's personnel to provide necessary basic instruction in the proper operation and maintenance of the entire work. Such arrangements must be coordinated well in advance with the Owner, Architect, and respective Engineer.
- b. Where installers are not experienced in the required procedures, include instructions by manufacturer's representatives.
- c. As part of this instruction, provide a detailed review of the following items:
 - (1) Maintenance manuals.
 - (2) Record documents.
 - (3) Tools.
 - (4) Spare parts and materials.
 - (5) Lubricants.
 - (6) Fuels.
 - (7) Identification systems.
 - (8) Control sequences.
 - (9) Hazards.
 - (10) Cleaning.

- (11) Warranties, bonds, maintenance agreements and similar continuing commitments.
- d. As part of this instruction for operating equipment, demonstrate the following procedures:
 - (1) Start-up.
 - (2) Shut-down.
 - (3) Emergency operations.
 - (4) Noise and vibration adjustments.
 - (5) Safety procedures.
 - (6) Economy and efficiency adjustments.
 - (7) Effective energy utilization.
- e. Contractors shall also comply with specific requirements as discussed in other sections of these specifications.

.08 CLEANING MATERIALS AND EQUIPMENT:

- a. Provide required personnel, equipment and material needed to maintain the specified standard of cleanliness.
- b. Use only the cleaning materials and equipment which are compatible with the surface being cleaned as recommended by the manufacturer of the material.

.09 PROGRESS CLEANING AND PROTECTION:

- a. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- b. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.
- c. General:
 - (1) Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage and providing required protection of material.
 - (2) Do not allow accumulation of scrap, debris, waste material and other items not required for construction of this Work.
 - (3) At least once each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.

- (4) Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- d. Site:
 - (1) Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
 - (2) Weekly, and more often if necessary, inspect all arrangement of material stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph .09.c.(1) above.
 - (3) Maintain the site in a neat and orderly condition at all times. Weekly, and more often if necessary, remove waste materials, debris and rubbish from site and dispose of in an acceptable manner.
- e. Building:
 - (1) Daily, and more often if necessary, inspect the structure and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
 - (2) Weekly, and more often if necessary, sweep interior spaces clean. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and hand-held broom.
 - (3) As required, preparatory to installation of succeeding material, clean the structure or pertinent portions to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and material required to achieve the necessary cleanliness.
 - (4) Remove debris and rubbish from pipe chases, plenums, crawl spaces, and other closed and remote spaces prior to enclosing the space.
 - (5) Following the installation of floor materials, clean the floor daily (and more often if necessary) at all times while work is being performed in the space in which installed. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Architect/Engineer, may be injurious to the floor material.
- f. Architect/Engineer shall be sole judge as to cleaning responsibility in case of dispute.

.10 FINAL CLEANING AND PROTECTION:

- a. The Contractor shall have overall responsibility for all final cleaning requirements unless otherwise specifically indicated.

- b. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and material. Comply with all manufacturer's instructions/recommendations regarding cleaning operations.
- c. Prior to completion of the Work, Contractor shall remove from the job site all tools, surplus material, equipment, scrap, debris and waste; and conduct final progress cleaning as described in paragraph .04 above.
- d. Site:
- (1) Unless otherwise specifically directed by the Architect/Engineer, broom clean paved areas on the site and public paved areas adjacent to the site.
 - (2) Completely remove resultant debris.
- e. Building:
- (1) Exterior:
 - (a) Visually inspect exterior surfaces and remove all traces of soil, waste material, smudges and other foreign matter.
 - (2) Interior:
 - (a) Visually inspect interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter.
 - (b) Remove all traces of splashed material from adjacent surfaces.
 - (c) Remove spots, stains, films, dust, dirt, and similar noticeable distracting substances from finished surfaces.
 - (d) Restore reflective surfaces to original reflective condition.
 - (e) Leave concrete floors broom clean.
 - (f) Remove labels which are not required as permanent labels.
 - (3) Concrete: Remove all rough surfaces resulting from form marks, ties, patching, etc. Fill large voids and, where surface is to be coated with a separate finish material, fill all voids including air pockets, etc. Fill material to be of type best suited to job condition and as approved by the Architect/Engineer.
 - (4) Painted and Decorated Work: Remove all foreign marks, stains, fingerprints, scuffs and other soil or dirt. If paint surface appearance is altered by cleaning process,

refinish spot or area as required to match with overall adjacent surface. Vacuum or wipe down all surfaces to remove dust just prior to Owner occupancy.

- (5) Hardware: Remove all stains, paint, fingerprints and other foreign matter; wash and polish to original finish. If any factory applied lacquer is damaged by job materials resulting in a permanent stain, hardware item must be replaced at General Contractor's expense.
- (6) Glass and Tile: Remove all putty, mortar, paint, fingermarks and other foreign surface blemishes; wash clean and polish. Replace chipped, damaged or broken glass.
- (7) Building Equipment: General Contractor shall wipe surfaces of all General Contractor installed building equipment clean, including all accessible interior spaces. Remove excess lubrication and other substances.
- (8) Mechanical and Electrical Equipment: Respective Mechanical and Electrical Contractors shall wipe surfaces of mechanical and electrical equipment clean, including all accessible interior spaces. Remove excess lubrication and other substances.
- (9) Plumbing Fixtures: Mechanical Contractor shall clean all plumbing fixtures to a sanitary condition.
- (10) Light Fixtures: Electrical Contractor shall clean all light fixtures and lamps. Replace lamps as necessary.
- (11) Ventilation Systems: Mechanical Contractor is to clean out any debris in ductwork and vacuum entire duct system prior to final inspection. Clean ventilating units and replace any soiled filter elements.
- (12) Mechanical Rooms: Mechanical Contractor shall sweep and vacuum debris and dust from all such spaces just prior to final inspection.
- (13) Electrical Rooms: Electrical Contractor shall sweep and vacuum debris and dust from all such spaces just prior to final inspection.
- (14) Special Areas: Where any portion of completed building was used for shop, storage, material preparation, etc., the respective Contractor must restore all material to original condition. If surface is not scheduled for any applied finish, stains must be completely removed or surface must be finished at respective Contractor's expense and as directed by Architect. Any scheduled unfinished concrete floors that are patched or leveled, resulting in unmatched appearance, must be finished at General Contractor's expense and as directed by Architect.

f. Schedule final cleaning as approved by the Architect/Engineer to enable the Owner to accept a completely clean Work.

- g. Architect/Engineer shall be sole judge as to final cleaning responsibilities in case of dispute.

.11 CLOSEOUT DESCRIPTION:

Closeout is hereby defined to include general requirements of respective Prime Contractors near the end of Contract Time in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner, and similar actions evidencing completion of the Work. Specific requirements for individual units of work are specified in relative sections of these specifications. Time of closeout is directly related to "Substantial Completion" and, therefore, may be either a single time period for entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation shall be applicable to other provisions of this section.

.12 CLOSEOUT PROCEDURES:

a. Substantial Completion:

- (1) Contractor will submit a written request to the Architect/Engineer along with a list of ALL items to be completed and/or corrected.
- (2) Within a reasonable time after receipt of the list, the Architect/Engineer will either proceed with inspection or advise Contractor of prerequisites not fulfilled.
- (3) Following the initial inspection, should the Architect/Engineer determine that the Work is not substantially complete:
 - (a) The Architect/Engineer will promptly notify the Contractor, in writing, giving the reasons therefore.
 - (b) The Contractor will remedy the deficiencies and notify the Architect/ Engineer when ready for reinspection.
 - (c) The Architect/Engineer will reinspect the Work when assured that the work has been substantially completed.
- (4) When the Architect/Engineer concurs that the Work is substantially complete:
 - (a) The Owner will prepare a "Certificate of Substantial Completion" on AIA Document G704, accompanied by the Architect/Engineer's final inspection report and submit to all parties concerned for their written acceptance of the responsibilities assigned to them in the Certificate.
- (5) Certificate of Substantial Completion will identify initial "punchlist" for final acceptance.
- (6) Deliver tools, spare parts, extra stocks of materials and similar physical items to Owner.

- (7) Make final change-over of locks and transmit keys to Owner and advise Owner's Representative of change-over in security provisions.
 - (8) Complete start-up testing of systems and instructions of Owner's operating/maintenance personnel.
 - (9) Complete final cleaning-up requirements, including touch-up, repair and/or restoration of marred surfaces. See Paragraph .10.
 - (10) Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities and similar elements.
- b. Contractors shall also comply with specific requirements as discussed in other sections of these specifications.
- c. Final Completion:
- (1) Prior to requesting Architect/Engineer's final re-inspection for certification of final acceptance, assure that all items on Architect/Engineer's final "punchlist" have been completed, corrected, or otherwise resolved for acceptance.
 - (2) Submit copy of Architect/Engineer's final punchlist of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
 - (3) Certify that:
 - (a) Contract Documents have been reviewed.
 - (b) Work has been inspected for compliance with the Contract Documents.
 - (c) Work has been completed in accordance with the Contract Documents.
 - (d) Work is completed and ready for final inspection.
 - (4) The Architect/Engineer will make an inspection to verify status of completion.
 - (5) Should the Architect/Engineer determine that the Work is incomplete or defective:
 - (a) The Architect/Engineer will promptly notify the Contractor, in writing, listing the incomplete or defective work.
 - (b) The Contractor shall remedy the deficiencies promptly, and notify the Architect/Engineer when ready for inspection.
 - (6) When the Architect/Engineer determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.

.13 FINAL PAYMENT:

Neither the final payment nor the remaining retained percentage shall become due until Contractor completes all the above requirements of this specification section.

END OF SECTION 01 7000

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.01 SECTION INCLUDES

- a. Scope of Work.
- b. Manuals.
- c. Project Record Documents.
- c. Operation and Maintenance Data.
- d. Warranties.

.02 SCOPE OF WORK:

- a. Closeout Submittals and Actions: Closeout submittals and actions include, but are not necessarily limited to:
 - (1) All items specifically required under Paragraph 9.10.6 of the General Conditions of the Contract for Construction (AIA Document A201).
 - (2) Evidence of final, continuing insurance coverage complying with insurance requirements. Include certificate of insurance for products and completed operations where required. Advise Owner of pending insurance change-over requirements.
 - (3) Final liquidated damages settlement statement (if any), acceptable to Owner.
 - (4) Specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
 - (5) Evidence of compliance with requirements of governmental agencies having jurisdiction for Certificates of Inspection. Obtain and submit release enabling Owner's full and unrestricted use of the work and access to services and utilities.
 - (6) Submit maintenance manuals and similar final record information. See Specification Section 01 7000.
- b. Contractors shall also comply with specific requirements as discussed in other sections of these specifications.

.03 MANUALS:

- a. General: Unless otherwise specifically directed by the Architect/Engineer elsewhere in the specifications, prepare all required manuals covering items included in this work in accordance with the following:

- (1) Operation and maintenance data shall be submitted electronically in PDF format on Read/Write (R/W) Compact Disks (CDs) formatted to allow the data to be read and copied to and from the CD. Each CD and its case shall be professionally labeled with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of CD.
 - (a) Provide a file folder containing a master index at beginning of each CD's electronic manual file structure showing items included. The CD shall be subdivided with file folders and subfolders logically organized and labeled to allow ease of access to the data.
 - (b) First section of each respective Contractors CD shall consist of directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, subcontractors, and major equipment suppliers.
 - (c) Provide file folders/subfolders for each type of equipment arranged in order similar to the specifications. All sections shall be clearly labeled on the CD. At beginning of each section provide suppliers name, address and phone numbers.
- (2) Descriptive Literature:
 - (a) Include descriptive literature (manufacturer's catalog and data) of each manufactured item. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
 - (b) Copy of the approved Shop Drawing(s) with all data concerning changes made during construction.
- (3) Operating instructions shall include step by step procedure to follow in putting each piece of equipment into operation.
- (4) Maintenance instructions shall include:
 - (a) Manufacturer's maintenance instructions for each piece of equipment installed in project. Instructions shall include installation instructions, parts numbers and lists, operation instructions of equipment, name of vendor, and maintenance and lubrication instructions.
 - (b) Summary list of equipment requiring lubrication showing name of equipment, location, and type and frequency of lubrication.
 - (c) List of equipment used indicating name, model, serial number, and nameplate of each item together with number and name associated with each system item.
 - (d) Test run reports if applicable/required.

- b. Extraneous Data: Where contents of the electronic manuals include manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete, or otherwise clearly indicate, all manufacturer's data with which this installation is not concerned.
- c. Safety Data Sheets: Any materials installed that have an associated Safety Data Sheet (SDS) shall be included in the maintenance manuals under a separate tab.
- d. Number of Copies Required: The Contractor shall provide one copy of their electronic maintenance manual to the Architect/Engineer for review. Unless otherwise specifically directed by the Architect/Engineer, each Contractor shall deliver three (3) approved CDs to the Architect/Engineer before final inspection.

.04 PROJECT RECORD DOCUMENTS:

- a. General:
 - (1) Specific requirements for record documents are indicated in individual sections of these specifications. Other requirements are indicated in the General Conditions. General submittal requirements are indicated in the various "submittals" sections.
 - (2) Maintain on site, one set of the following record documents and record actual revisions to the Work:
 - (a) Contract Drawings.
 - (b) Specifications.
 - (c) Addenda.
 - (d) Change Orders and other Modifications to the Contract.
 - (e) Reviewed shop drawings, product data, and samples.
 - (3) Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect/Engineer's reference during normal working hours.
- b. Record Drawings: The Contractor shall maintain a record set of blue line white-prints of contract drawings and shop drawings in clean, undamaged condition. All other subcontractors shall record work variations on the Contractor's record set. Mark-up the set of record documents to show the actual installation where the installed work varies from the work as originally shown. Mark whichever drawings are most capable of showing the actual "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross reference at corresponding locations on the working drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.

- (1) Mark record set with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work. Mark-up new information which is known to be important to the Owner but, for some reason, was not shown on either contract drawings or shop drawings.
 - (2) The Contractor shall, during the progress of the work, keep accurate data on locations and elevations of underground/concealed work so that he may prepare a survey containing the final exact elevations and locations of all such work, especially that work for which an elevation or dimensional location is indicated and/or specified within the plans and/or specifications.
 - (a) Measured depths of foundations in relation to finish main floor datum.
 - (b) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - (c) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - (d) Field changes of dimension and detail.
 - (e) Details not on original Contract Drawings.
 - (3) Note related change order numbers where applicable.
 - (4) Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on the cover of each set. Submit to Architect/Engineer.
- c. Record Specifications:
- (1) Legibly mark and record at each Product section description of actual Products installed, including the following:
 - (a) Manufacturer's name and product model and number.
 - (b) Product substitutions or alternates utilized.
 - (c) Changes made by Addenda and Modifications.
 - (2) Upon completion of mark-up, submit a complete record specification to Architect/Engineer for Owner's records.
- d. Record Product Data:
- (1) Maintain one copy of each product data submittal. Mark these documents to show variations in the actual work performed in comparison with the submitted information.

Include both variations in the products as delivered to the site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and specifications.

- (2) Upon completion of mark-up, submit complete set of record product data to the Architect/Engineer for the Owner's records.
- e. Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with the actual performance of the work. Immediately prior to the date or dates of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect/Engineer for the Owner's records.

.05 WARRANTIES:

- a. The date of Substantial Completion of the project is also date of commencement of applicable warranties required by contract documents.
- b. Provide duplicate notarized copies.
- c. Execute and assemble documents from subcontractors, suppliers, and manufacturers.
- d. Provide Table of Contents and assemble in three (3) ring binder with durable plastic cover.
- e. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.

END OF SECTION 01 7800

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**SECTION 02 4100
DEMOLITION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

- A. Section 01 1100 - Summary of Work: 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.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

- A. Remove items as indicated for new construction.
- B. Remove other items indicated, for salvage, relocation, and recycling.

3.02 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. 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.
 - 3. Provide, erect, and maintain temporary barriers and security devices.
 - 4. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 5. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 6. Do not close or obstruct roadways or sidewalks without permit.
 - 7. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 8. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.

- E. Demolition work involves the removal of materials that could be painted with lead-based paints. Contractor is to take the necessary precautions to control dust. All local, state, and federal regulations regarding safe handling of lead materials must be followed.
- F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials may include suspect regulated asbestos containing materials, PCB's, and mercury.
- G. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as 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. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- C. 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.
- D. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
 - 4. Patch as specified for patching new work.

3.04 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site and dispose of at an appropriate solid waste disposal facility.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

**SECTION 03 3000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete slab on grade.
- B. Concrete reinforcement.
- C. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 01 4000 - Testing and Laboratory Services: Special Inspections for concrete and reinforcing.
- B. Section 03 3543 - Diamond Polishing Concrete Floors: Additional requirements for concrete floors to be polished.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- B. ACI 301 - Specifications for Structural Concrete; 2016.
- C. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- E. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- G. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- H. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- J. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- K. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- L. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- M. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011 (Reapproved 2017).
- N. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Mix Design: Submit proposed concrete mix design.
- C. Test Reports: Submit report for each test or series of tests specified.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.

PART 2 PRODUCTS

2.01 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
 - 1. Type: Deformed billet-steel bars.
 - 2. Finish: Unfinished, unless otherwise indicated.
- B. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch (1.29 mm).
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 - 1. Acquire aggregates for entire project from same source.
- C. Fly Ash: Maximum 25%.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.03 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Waterproofing Admixture: Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties.

2.04 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: 10 mil sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
 - 1. Installation: Comply with ASTM E1643.
 - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.

2.05 CURING MATERIALS

- A. Curing and Sealing Compound, Low Gloss: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C1315 Type 1 Class A.
 - 1. Application: Use at exposed interior concrete slabs not receiving other floor finishes.
 - 2. Manufacturers:
 - a. W. R. Meadows, Inc; VOCOMP-25: www.wrmeadows.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.06 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

- D. Interior Slabs on Grade
 - 1. Cementitious Product Type (Low alkali) : Portland Type I or I / II Max 20% Fly Ash Allowed. Note that flyash will retard initial set.
 - 2. Maximum Aggregate Size: 3/4"
 - 3. Maximum Slump: 3"
 - 4. 28 Day Compressive Strength: 4,000 psi
 - 5. Maximum Water/Cement Ratio: 0.50
 - 6. Allowed Admixtures; Required Air-Entrained Contents for freshly poured concrete: WRDA-No Entrained Air. Mid Range Plasticizer or Super Plasticizer with prior approval.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- A. Interior Slabs on Grade: Install 10 mil vapor retarder under interior slabs on grade. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Ensure reinforcement, inserts, and embedded parts will not be disturbed during concrete placement.
- D. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 SLAB JOINTING

- A. Locate joints to match existing.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness:
 - 1. Exposed Concrete Floors: 1/4 inch (6 mm) in 10 feet (3 m).
 - 2. Under Carpeting and VCT: 1/8 inch (3 mm) in 10 feet (3 m).
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING

- A. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
 - 2. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to be polished.
 - 3. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.08 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
 - 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
 - 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 - 3. Final Curing: Begin after initial curing but before surface is dry.
 - a. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.09 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests as specified in Section 01 4000 - Testing and Laboratory Services.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards (76 cu m) or less of each class of concrete placed.
- E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.10 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

END OF SECTION

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**SECTION 03 3543
DIAMOND POLISHING CONCRETE FLOORS****PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Diamond Polishing Concrete Floors

1.02 DEFINITIONS

- A. Terminology: As defined by CPAA.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's technical literature for each product indicated, specified, or required. Include manufacturer's technical data, application instructions, and recommendations.
- C. Maintenance Data: For inclusion in maintenance manual required by Division 01.
 - 1. Include manufacturer's instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use.
 - 2. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.

1.04 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting liquid applied product application.

PART 2 - PRODUCTS**2.01 LIQUID APPLIED PRODUCTS**

- A. Liquid Densifier: Odorless, non-hazardous, silicate that penetrates concrete to react with free lime and calcium hydroxide to produce permanent chemical reaction that hardens and densifies concrete surface.
- B. Polish Guard: Non-film forming, stain resistant, food resistant, chemical stain resistant, impregnating sealant designed to be used on concrete surfaces previously densified.

2.02 ACCESSORIES

- A. Patching Compound: Compound composed of 40 percent portland cement, 45 percent limestone, and 15 percent vinyl acetate copolymer, when mixed with dust salvaged from grinding process forms a paste that hardens when surface imperfections are filled.
- B. Grout Material: Clear modified silicate sealant, containing no pore clogging latex, when mixed with dust salvaged from grinding process forms a paste that reacts with calcium hydroxide in concrete that hardens when surface imperfections are filled.
- C. Protective Cover: Non-woven, puncture and tear resistant, polypropylene fibers laminated with a multi-ply, textured membrane, not less than 18 mils in thickness.

2.03 POLISHING EQUIPMENT

- A. Field Grinding and Polishing Equipment:
 - 1. Variable speed, multiple head, counter-rotating, walk-behind machine with not less than 600 pounds of down pressure on grinding or diamond polishing pads.
 - 2. If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments.

- B. Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines which produces same results, without noticeable differences, as field grinding and polishing equipment.
- C. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with sufficient head pressure of not less than 20 pounds to raise floor temperature by 20 degrees F.
- D. Metal Bonded Pads: Grinding pads with embedded industrial grade diamonds of varying grits fabricated for mounting on equipment.
- E. Resin Bonded Pads: Polishing pads with embedded industrial grade diamonds of varying grits fabricated for mounting on equipment.
- F. Burnishing Pads: Maintenance pads for use with high speed burnishing equipment.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Acceptance of Surfaces and Conditions:
 - 1. Examine substrates to be polished for compliance with requirements and other conditions affecting performance.
 - 2. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents.
 - 3. Starting work within a particular area will be construed as acceptance of surface conditions.

3.02 PREPARATION

- A. Cleaning New Concrete Surfaces:
 - 1. Prepare and clean concrete surfaces. Fill small holes, recesses and low spots.
 - 2. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, paint splatter, and other contaminants incompatible with liquid applied products and polishing.

3.03 POLISHING CONCRETE FLOORS

- A. Initial Grinding:
 - 1. Use grinding equipment with metal bonded grinding pads.
 - 2. Begin grinding in one direction using sufficient size grit pad.
 - 3. Make sequential passes with each pass perpendicular to previous pass using finer grit pad with each pass, up to 150 grit.
 - 4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
 - 5. Vacuum floor using squeegee vacuum attachment after each pass.
 - 6. Continue grinding until aggregate exposure matches approved field mock-ups.
- B. Treating Surface Imperfections:
 - 1. Mix patching compound and grout material with dust created by grinding operations to match color of adjacent concrete surface.
 - 2. Fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids.
 - 3. Work compound and treatment until color differences between concrete surface and filled surface imperfections are not reasonably noticeable when viewed from 10 feet away under lighting conditions that will be present after construction.
- C. Liquid Densifier Application: Apply undiluted to point of rejection, remove excess liquid, and allow to cure according to manufacturers instructions.
- D. Grout Grinding:
 - 1. Use grinding equipment and appropriate grit grinding pads.

2. While applying fresh grout material prior to, grind concrete in direction perpendicular to initial grinding to remove scratches.
 3. Vacuum floor using squeegee vacuum attachment after each pass.
- E. Honing:
1. Use grinding equipment with resin bonded grinding pads.
 2. Grind concrete in one direction starting with 50 grit pad and make as many sequential passes required to remove scratches, each pass perpendicular to previous pass, up to 400 grit pad reaching maximum refinement with each pass before proceeding to finer grit pads.
 3. Auto scrub or vacuum floor using squeegee vacuum attachment after each pass.
- F. Polishing:
1. Use polishing equipment with resin bonded polishing and burnishing pads.
 2. Begin polishing in one direction starting with 800 grit pad.
 3. Make sequential passes with each pass perpendicular to previous pass using finer grit pad with each pass, up to 3000 grit.
 4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
 5. Auto scrub or vacuum floor using squeegee vacuum attachment after each pass.
 6. Continue polishing until gloss appearance, as measured according to ASTM E 430, matches approved field mock-ups.
- G. Polish Guard: Uniformly apply and remove excessive liquid according to manufacturer's instructions.
- H. Final Polish: Using burnishing equipment and finest grit burnishing pads, burnish to uniform sheen matching approved mock-up.
- I. Final Polished Concrete Floor Finish:
1. Class C - Medium Aggregate Finish: Remove not more than 1/8 inch of concrete surface by grinding and polishing resulting in majority of exposure displaying medium aggregate with no, or small amount of, large aggregate at random locations.
 2. Level 3 - High Gloss Appearance:
 - a. Procedure: Not less than 6 steps with full refinement of each diamond pad up to 1500 grit resin bonded pad with one application of densifier.
 - b. Gloss Reading: Not less than 60 according to ASTM E 430 before polish guard application.

3.04 CLOSEOUT ACTIVITIES

- A. Maintenance Training: Contractor shall train Owner's designated personnel in proper procedures for maintaining polished concrete floor.

3.05 PROTECTION

- A. Covering: After completion of polishing, protect polished floors from subsequent construction activities with protective covering when needed.

END OF SECTION

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**SECTION 06 1000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-structural dimension lumber framing (contractor's option).
- B. Rough opening framing for doors, windows, and roof openings.
- C. Sheathing.
- D. Miscellaneous framing and sheathing.
- E. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

- A. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- B. AWPA U1 - Use Category System: User Specification for Treated Wood; 2017.
- C. PS 20 - American Softwood Lumber Standard; 2015.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
 - 1. Grade: No. 2.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

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

3.02 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 walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.
 - 7. Wall-mounted monitors.

3.03 INSTALLATION OF CONSTRUCTION PANELS

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.

END OF SECTION

**SECTION 06 2000
FINISH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wood casings and moldings for windows replaced under alternate bid.
- B. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Samples: Submit two samples of wood trim 4 inches long.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect from moisture damage.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Interior Woodwork Items:
 - 1. Moldings, Bases, Casings, and Miscellaneous Trim: Match profile and finish to existing.

2.02 FASTENINGS

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Fasteners: Of size and type to suit application.

2.03 ACCESSORIES

- A. Wood Filler: Solvent base, tinted to match surface finish color.

2.04 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.05 SHOP FINISHING

- A. Sand work smooth and set exposed nails.
- B. Apply wood filler in exposed nail indentations.
- C. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. Sheen: Satin.
 - b. Color: Match to existing wood finish.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim to conceal larger gaps.
- D. Install components with nails at 16 inch on center.
- E. Miter-return ends of any exposed running trim.

3.02 FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

3.03 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch (1.6 mm).
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.79 mm).

END OF SECTION

**SECTION 06 4100
ARCHITECTURAL WOOD CASEWORK**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Hardware.
- C. Factory finishing.

1.02 RELATED REQUIREMENTS

- A. Section 12 3600 - Countertops.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).
- D. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.

1.04 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. Product Data: Provide data for hardware accessories.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.07 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Wood Veneer: Red oak, rotary cut, random matched. Stain to match existing window casing.
- C. Wood Veneer Cabinets: Custom Grade
 - 1. Finish - Exposed Exterior Surfaces: Wood.
 - 2. Finish - Exposed Interior Surfaces: Wood.
 - 3. Finish - Semi-Exposed Surfaces: Wood
 - 4. Finish - Concealed Surfaces: White melamine.
 - 5. Casework Construction Type: Type A - Frameless.
 - 6. Interface Style for Cabinet and Door: Style 2 - Finish Inset; flush overlay.
 - 7. Grained Face Layout for Cabinet and Door Fronts: Flush panel.

- a. Custom Grade: Doors, drawer fronts and false fronts wood grain to run and match vertically within each cabinet unit.
- 8. Adjustable Shelf Loading: 50 lbs. per sq. ft.
 - a. Thickness: Meeting AWI Standards for length and loading.
- 9. Cabinet Style: Flush overlay.
- 10. Drawer Side Construction: Manufacturer's option, meeting premium grade.

2.02 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.
- B. Provide products free of urea-formaldehyde.

2.03 COUNTERTOPS

- A. Countertops are specified in Section 12 3600.

2.04 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Fasteners: Size and type to suit application.
- C. Concealed Joint Fasteners: Threaded steel.

2.05 HARDWARE

- A. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1.26 inch (32 mm) spacing adjustments.
- B. Countertop Supports:
 - 1. Material: Steel
 - 2. Finish/Color: Black powdercoat.
 - 3. Manufacturers:
 - a. Basis of Design: US Futuba 72531, 8" x 24".
- C. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers ("U" shaped wire pull, steel with satin finish, 100 mm centers).
- D. Drawer Slides:
 - 1. Type: Full extension.
 - 2. Static Load Capacity: 100 pound @ 6" deep drawers.
 - 3. Mounting: Side mounted.
 - 4. Stops: Integral type.
 - 5. Features: Provide self closing/stay closed type.
- E. Hinges: European style concealed self-closing type, steel with polished finish.

2.06 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

2.07 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.
- C. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

1. Semi-Transparent:
 - a. System - 1, Lacquer, Nitrocellulose.
 - b. Stain: To match existing sample.
 - c. Sheen: Flat.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.02 ADJUSTING

- A. Adjust moving or operating parts to function smoothly and correctly.

3.03 CLEANING

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

END OF SECTION

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**SECTION 06 8316
FIBERGLASS REINFORCED PANELING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiberglass reinforced plastic panels.
- B. Trim.

1.02 REFERENCE STANDARDS

- A. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2017.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.03 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. Samples: Submit two samples 6 x 6 inch in size illustrating material and surface design of panels.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fiberglass Reinforced Plastic Panels:
 - 1. Marlite, Inc: www.marlite.com/#sle.
 - 2. Nudo Products, Inc: www.nudo.com/#sle.

2.02 PANEL SYSTEMS

- A. Wall Panels:
 - 1. Panel Size: 4 by 8 feet (1.2 by 2.4 m).
 - 2. Panel Thickness: 0.10 inch (2.5 mm).
 - 3. Surface Design: Embossed.
 - 4. Color: As selected by Architect from Manufacturer's standard range..
 - 5. Attachment Method: Adhesive only, with trim and sealant in joints.

2.03 MATERIALS

- A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
 - 1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
- B. Trim: Vinyl; color coordinating with panel.
- C. Sealant: Type recommended by panel manufacturer; color matching panel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION - WALLS

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.

- C. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- D. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- E. Install panels with manufacturer's recommended gap for panel field and corner joints.
- F. Place trim on panel before fastening edges, as required.
- G. Fill channels in trim with sealant before attaching to panel.
- H. Install trim with adhesive and screws or nails, as required.
- I. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
- J. Remove excess sealant after paneling is installed and prior to curing.

END OF SECTION

**SECTION 07 2126
BLOWN INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Ceiling and Attic: Blown insulation pneumatically placed into attic to replace insulation at removed ceiling elements.

1.02 REFERENCE STANDARDS

- A. ASTM C764 - Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation; 2017.
- B. ASTM C1015 - Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation; 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and limitations.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Loose Fill Insulation: ASTM C764, mineral wool fiber types, nodulated for pour and bulk for pneumatic placement.
 - 1. Thermal Conductivity: 0.27 BTU in/(hr sq ft deg F)
 - 2. Installed Thickness: To match existing thickness.
- B. Ventilation Baffles: Formed plastic.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install insulation and ventilation baffle in accordance with ASTM C1015 and manufacturer's instructions.
- B. Place insulation pneumatically to completely fill joist and rafter spaces.
- C. Place insulation against baffles, and do not impede natural attic ventilation to soffit.
- D. Completely fill intended spaces leaving no gaps or voids.

END OF SECTION

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**SECTION 07 9005
JOINT SEALERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.

1.02 REFERENCE STANDARDS

- A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- B. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics.

1.04 FIELD CONDITIONS

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

1.05 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Polyurethane Sealants:
 - 1. Bostik Inc: www.bostik-us.com.
 - 2. Pecora Corporation: www.pecora.com.
 - 3. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
 - 4. Sika: www.sika.com
 - 5. Tremco Incorporated: www.tremco.com.

2.02 SEALANTS

- A. General Purpose Interior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
 - 1. Color: Match adjacent finished surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

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

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Install bond breaker where joint backing is not used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Tool joints: Concave.

3.04 CLEANING

- A. Clean adjacent soiled surfaces.

3.05 PROTECTION

- A. Protect sealants until cured.

END OF SECTION

**SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated Hollow metal doors and frames.

1.02 RELATED REQUIREMENTS

- A. Section 08 1416 - Flush Wood Doors.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 - Glazing: Glass for doors.
- D. Section 09 9000 - Painting & Coating: Field painting.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- I. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- M. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- N. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- O. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.05 QUALITY ASSURANCE

- A. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
 - 2. Windsor Republic Doors: www.republicdoor.com.
 - 3. Steelcraft, an Allegion brand: www.allegion.com/sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Frames:
 - 1. Steel used for fabrication frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Typical Door Face Sheets: Flush.
 - 4. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 - 5. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. General:
 - 1. Comply with the requirements of grade specified for corresponding door, except:
 - a. ANSI A250.8 Level 2 and Level 3 Doors: 16 gage frames.
 - 2. Finish: Factory primed, for field finishing.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
 - 1. Frame Metal Thickness: 16 gauge, 0.053 inch (1.3 mm), minimum.
 - 2. Frame Finish: Factory primed and field finished.
- D. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

2.04 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.05 ACCESSORIES

- A. Door Position Sensors: Prep doors and frames for door position sensors (by Div 28) as required.
- B. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- C. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions. Omit on doors scheduled to have weatherstripping.

2.06 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Install door hardware as specified in Section 08 7100.
- D. Coordinate installation of electrical connections to electrical hardware items.
- E. Touch up damaged factory finishes.

3.03 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 (1.6 mm) measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.05 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

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**SECTION 08 1416
FLUSH WOOD DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 7100 - Door Hardware.
- C. Section 08 8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).
- D. FM (AG) - FM Approval Guide; current edition.
- E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- F. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.04 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.
- D. Samples: Submit two samples of door veneer, 6 by 6 inch (152 by 152 mm) in size illustrating wood grain, stain color, and sheen.
- E. Warranty, executed in Owner's name.

1.05 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.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Graham Wood Doors: www.grahamdoors.com.

2. Marshfield DoorSystems, Inc: www.marshfelddoors.com.
3. VT Industries: www.vtindustries.com.

2.02 DOORS AND PANELS

- A. Doors: See drawings for locations and additional requirements.
- B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
 1. Provide solid core doors at each location.

2.03 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: White oak, veneer grade in accordance with quality standard indicated, quarter cut, with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face; verify to match existing wood sample.

2.04 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- C. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- D. Provide edge clearances in accordance with the quality standard specified.

2.05 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:
 1. Transparent:
 - a. System - 12, Polyurethane, Water-based.
 - b. Stain: As selected by Architect to match existing doors on site.
 - c. Sheen: Flat.

2.06 ACCESSORIES

- A. Hollow Metal Door Frames: See Section 08 1113.
- B. Glazing: See Section 08 8000.
- C. Glazing Stops: Wood, of same species as door facing, mitered flush typenailed into core; fill nailheads.
- D. Door Hardware: See Section 08 7100.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- 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.
- E. Coordinate installation of glazing.

3.02 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION

**SECTION 08 5200
WOOD WINDOWS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Factory fabricated wood windows provided under alternate bid.
- B. Glazing.
- C. Operating hardware.
- D. Insect screens.

1.02 RELATED REQUIREMENTS

- A. Section 07 9005 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 09 9000 - Interior Painting: Site finishing wood surfaces.

1.03 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Show component dimensions, anchorage and fasteners, glass, and internal drainage details.
- C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect factory finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C).
- B. Maintain this minimum temperature during and after installation of sealants.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum Clad Wood Windows:
 - 1. Andersen Windows, Inc; E-Series Awning Windows: www.andersenwindows.com/#sle.
 - 2. Pella Corporation: www.pellacommercial.com/#sle.

3. Marvin Windows
4. Jeld-Wen Windows

2.02 WOOD WINDOWS

- A. Wood Windows: Wood frame and sash, factory fabricated and assembled.
 1. Exterior Finish: Metal clad, painted.
 2. Interior Finish: Unfinished, for opaque finish.
 3. Color: As selected by Architect from manufacturer's standard range.
 4. Configuration: As indicated on drawings.
 5. Window Product Types: AP - Awning, hopper, projected window and FW - Fixed window, in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
 6. Factory glazed; dry glazing method.
 7. Wood Species: Clear pine, preservative treated using treatment type suitable for required finish.
 8. Frame and Sash Members: Mortise and tenon joints. Glue and steel pin joints to hairline fit, weather tight.
 9. Metal Cladding: Formed aluminum, factory finished, factory fit to profile of wood members.
 10. Weather Stop Flange: Continuous at perimeter of unit.
 11. Clearances and Shim Spacing: Minimum required for installation and dynamic movement of perimeter seal.
 12. Fasteners: Concealed from view.
 13. Internal Drainage of Glazing Spaces to Exterior: Weep holes.
 14. Insect Screen: Locate on inside of windows.
 15. Operable Units: Double weatherstripped.

2.03 COMPONENTS

- A. Glazing: Double glazed, clear, Low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions.
- B. Sills: Extruded aluminum, with () 1/16" nominal thickness; sloped for positive drainage; fits under sash and projects at least 1/2 inch (12 mm) beyond exterior face of wall; single piece full width of opening.
- C. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable supports allowing screen removal without use of tools.
 1. Supports: Spring-loaded steel pins; four per screen unit.
 2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
 3. Frame Finish: Baked enamel, color to match window interior color.
- D. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to effect weather seal.
- E. Fasteners: Stainless steel.
- F. Sealant and Backing Materials: As specified in Section 07 9200 of types as indicated.
- G. Flashing: Provide related flashings, with necessary anchors and attachment devices.
- H. Sealant for Setting Sills, Stools, Aprons, and Sill Flashing: Non-curing butyl type.

2.04 PERFORMANCE REQUIREMENTS

- A. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 requirements for the specific window type in accordance with the following:
 1. Performance Class (PC): R.
- B. Design Pressure (DP): In accordance with applicable codes.

- C. Overall Thermal Transmittance (U-value): 0.35, maximum, including glazing, measured on window sizes required for this project.

2.05 HARDWARE

- A. Sash lock: Lever handle with cam lock.
- B. Operator: Lever action handle fitted to projecting sash arms with limit stops; baked enamel finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Set sill members and sill flashing in continuous bead of sealant.
- E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Finish interior surfaces with opaque materials as specified in Section 09 9000.

3.03 TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inch per 3 ft (1.6 mm per m) non-cumulative or 1/8 inch per 10 ft (3.2 mm per 3 m), whichever is less.

3.04 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 CLEANING

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

END OF SECTION

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**SECTION 08 7100
DOOR HARDWARE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for wood and hollow metal doors.
- B. Electrically operated and controlled hardware.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 1416 - Flush Wood Doors.
- C. Section 28 1000 - Access Control : Electronic access control devices.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. BHMA A156.1 - American National Standard for Butts and Hinges; 2016.
- C. BHMA A156.2 - American National Standard for Bored and Preamsembled Locks & Latches; 2017.
- D. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.
- E. BHMA A156.6 - American National Standard for Architectural Door Trim; 2015.
- F. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2015.
- G. BHMA A156.18 - American National Standard for Materials and Finishes; 2016.
- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- I. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
- C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- E. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.05 QUALITY ASSURANCE

- A. Hardware Supplier Qualifications: Company specializing in supplying the type of products specified in this section with at least three years documented experience.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for door closers.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide door hardware specified, or as required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
 - 1. Applicable provisions of federal, state, and local codes.
 - 2. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
- D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.
- E. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.
- F. Finishes: Provide door hardware of the same finish unless otherwise indicated.
 - 1. Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
 - 2. Finish Definitions: BHMA A156.18.
 - 3. Exceptions:
 - a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.

2.02 LOCKS AND LATCHES

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
 - 1. If no hardware set is indicated for a swinging door provide an office lockset.
 - 2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
 - 3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders:
 - 1. Provide large format interchangeable core.
 - 2. Provide Schlage Primus cores.
 - 3. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Master keyed.
 - 1. Cylinder Keys
 - a. Key to existing keying system.
 - b. Supply 2 keys for each core.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".
- E. Manufacturers - Locks & Latches:
 - 1. Allegion Brands; Schlage: www.allegion.com/us.
 - 2. Assa Abloy Brands; Yale: www.assaabloydss.com.
 - 3. Hager Companies: www.hagerco.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.03 HINGES

- A. Hinges - Basis of Design: Ives, an Allegion Brand.
- B. Hinges: Provide hinges on every swinging door.
 - 1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.

2. Provide ball-bearing hinges at all doors having closers.
3. Where electrified hardware is mounted in door leaf, provide power transfer hinges.
- C. Quantity of Hinges Per Door:
 1. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.
- D. Manufacturers - Hinges:
 1. Allegion Brands; Ives: www.allegion.com/us.
 2. Assa Abloy Brands; McKinney: www.assaabloydss.com.
 3. Hager Companies: www.hagerco.com.
 4. Stanley Black & Decker: www.stanleyblackanddecker.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.

2.04 PUSH/PULLS

- A. Push/Pulls - Basis of Design: Hiawatha.
- B. Push/Pulls: Comply with BHMA A156.6.
 1. On solid doors, provide matching push plate and pull plate on opposite faces.
- C. Manufacturers - Push/Pulls:
 1. Assa Abloy Brands, McKinney: www.assaabloydss.com.
 2. Hager Companies: www.hagerco.com.
 3. Hiawatha, Inc, division of Activar Construction Products Group, Inc: www.activarcpg.com/hiawatha.
 4. Trimco: www.trimcohardware.com.
 5. Substitutions: See Section 01 6000 - Product Requirements.

2.05 CYLINDRICAL LOCKSETS

- A. Cylindrical Locksets - Basis of Design: Schlage, an Allegion brand.
- B. Locking Functions: As defined in BHMA A156.2, and as follows.
- C. Manufacturers - Cylindrical Locksets:
 1. Assa Abloy Brands, Corbin Russwin, Sargent, or Yale: www.assaabloydss.com.
 2. Best Access Systems, division of Stanley Security Solutions: www.bestaccess.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.

2.06 ELECTRONIC HARDWARE

- A. Electronic Locksets - Basis of Design: Allegion (Schlage or Von Duprin as scheduled)..
- B. Power Supplies
 1. Provided by Div 08
 2. Location: Locate all power supplies in IT Room 107.
 3. Product: Von Duprin PS914 or equal.
 4. Quantity: Minimum number needed to operate electronic hardware.
- C. Card Readers: Provided by Div 28
- D. Door Position Switch: Provided by Div 28
- E. Wiring: Provided by Div 28
- F. Request to Exit: Provided by Div 08 integral to hardware unless noted otherwise.

2.07 INTERCONNECTED LOCKSETS

- A. Interconnected Locksets - Basis of Design: Schlage L Series.
- B. Manufacturers - Interconnected Locksets:
 1. Schlage, an Allegion brand: www.allegion.com/us.
 2. Substitutions: Not permitted.

2.08 ELECTRIC STRIKES

- A. Institutional Grade, configuration to meet door latch type.
- B. Manufacturers - Electric Strikes:
 - 1. Assa Abloy Brands, Folger Adam EDC, HES, or Securitron: www.assaabloydss.com.
 - 2. Von Duprin: www.allegion.com/us.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.09 EXIT DEVICES

- A. Exit Devices - Basis of Design: Von Duprin.
- B. All exit devices to have hex key dogging.
- C. Manufacturers - Exit Devices:
 - 1. Von Duprin, an Allegion brand: www.allegion.com/us.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.10 CLOSERS

- A. Closers - Basis of Design: LCN, an Allegion Brand.
- B. Closers: Complying with BHMA A156.4.
 - 1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
 - 2. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.
 - 3. At corridors, locate door-mounted closer on room side of door.
 - 4. At outswinging exterior doors, mount closer in inside of door.
- C. Manufacturers - Surface Mounted Closers:
 - 1. Assa Abloy Brands, Corbin Russwin, Norton, Sargent, or Yale: www.assaabloydss.com.
 - 2. Stanley Door Hardware: www.stanleyhardwarefordoors.com
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.11 STOPS AND HOLDERS

- A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
 - 1. Provide wall stops, unless otherwise indicated.
 - 2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
 - 3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.
- B. Wall Stops: Burns 570.
- C. Overhead Holders/Stops: Glynn Johnson.
- D. Manufacturers - Overhead Holders/Stops:
 - 1. Assa Abloy Brands, Rixson or Sargent: www.assaabloydss.com.
 - 2. DORMA USA, Inc; 900 Series: www.dorma.com.
 - 3. Glynn-Johnson, an Allegion brand: www.allegion.com/us.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.12 GASKETING AND THRESHOLDS

- A. Gasketing and Thresholds - Basis of Design: Reese Enterprises, Inc.
- B. Manufacturers - Gasketing and Thresholds:
 - 1. Assa Abloy Brands, McKinney: www.assaabloydss.com.
 - 2. Hager Companies: www.hagerco.com.

3. National Guard Products, Inc: www.ngpinc.com.
4. Pemko Manufacturing Co: www.pemko.com.
5. Reese Enterprises, Inc: www.reeseusa.com.
6. Substitutions: See Section 01 6000 - Product Requirements.

2.13 PROTECTION PLATES AND ARCHITECTURAL TRIM

- A. Protection Plates and Architectural Trim - Basis of Design: Ives, an Allegion Brand.
- B. Protection Plates:
 1. Kickplate: Provide on push side of every door with closer, except aluminum storefront and glass entry doors.
- C. Manufacturers - Protection Plates and Architectural Trim:
 1. Rockwood Manufacturing Company, an Assa Abloy brand: www.rockwoodmfg.com.
 2. Hager Companies: www.hagerco.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item. As indicated in the following list; unless noted otherwise in Door Hardware Sets Schedule or on the drawings.

3.02 ADJUSTING

- A. Adjust hardware for smooth operation.

END OF SECTION

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**SECTION 08 8000
GLAZING**

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- B. Section 08 1416 - Flush Wood Doors: Glazed lites in doors.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).
- C. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- E. GANA (SM) - GANA Sealant Manual; 2008.
- F. ICC (IBC) - International Building Code; 2015.
- G. ITS (DIR) - Directory of Listed Products; current edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data on Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 WARRANTY

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

PART 2 PRODUCTS

2.01 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 - 2. Kind FT - Fully Tempered Type: Complies with ASTM C1048.

2.02 GLAZING UNITS

- A. Single Vision Glazing:
 - 1. Applications: Interior glazing unless otherwise indicated.
 - 2. Glass Type: Fully tempered float glass.
 - 3. Tint: Clear.
 - 4. Thickness: 1/4 inch (6.4 mm), nominal.

2.03 ACCESSORIES

- A. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.04 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

END OF SECTION

**SECTION 09 2116
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing (Contractor's Option).
- C. Metal channel ceiling framing.
- D. Acoustic insulation.
- E. Gypsum wallboard.
- F. Joint treatment and accessories.
- G. Textured finish system.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 07 2100 - Thermal Insulation: Acoustic insulation.

1.03 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).
- C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014, with Editorial Revision (2015).
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2017.
- G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2018b.
- H. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- I. 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; 2016.
- J. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- K. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.
- L. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- M. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- N. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.

1.04 SUBMITTALS

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

- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 METAL FRAMING MATERIALS (CONTRACTOR'S OPTION)

- A. Non-structural Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
 - 1. Studs: C-shaped with knurled or embossed faces.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Ceiling Channels: C-shaped.
- B. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and screwed to secondary deflection channel set inside but unattached to top track.

2.03 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. National Gypsum Company: www.nationalgypsum.com/#sle.
 - 5. USG Corporation: www.usg.com/#sle.
- 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 and ceilings, unless otherwise indicated.
 - 2. Unfaced fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
- C. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
 - 1. Application: Vertical surfaces behind thinset tile, except in wet areas.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Type X Thickness: 5/8 inch (16 mm).
 - 4. Edges: Tapered.

2.04 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit types, unfaced. Thickness to fill void at studs.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
 - 1. Products:
 - a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/#sle.
 - b. Liquid Nails, a brand of PPG Architectural Coatings; AS-825 Acoustical Sound Sealant: www.liquidnails.com/#sle.
 - c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant: www.stifirestop.com/#sle.
- C. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.

1. Types: As detailed or required for finished appearance.
- D. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
 1. Rigid 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. Type: V-shaped PVC with tear away fins.
- E. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 1. Paper Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
 - a. Ready-mixed joint compound.
 - b. Powder-type joint compound.
- F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- G. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
 1. Level ceiling system to a tolerance of 1/1200.
 2. Laterally brace entire suspension system.
- C. Studs: Space studs at 16 inches on center (at 406 mm on center).
 1. Extend partition framing to structure in all locations.
 2. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches (100 mm) from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 1. Place one bead continuously on substrate before installation of perimeter framing members.
 2. Place continuous bead at perimeter of each layer of gypsum board.
 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.04 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
- B. Corner Beads: Install at external corners, using longest practical lengths.

3.06 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 3: Walls to receive textured wall finish.
- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

3.07 TEXTURE FINISH

- A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.
- B. Texture Required: Orange Peel.

END OF SECTION

**SECTION 09 5100
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2017.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components and acoustical units.

1.04 PROJECT CONDITIONS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead work is completed, tested and approved.
- B. Install acoustical units after interior wet work is dry.

1.05 EXTRA MATERIALS

- A. Provide 5 percent of total acoustical unit area of each type of acoustical unit for Owner's use in maintenance of the project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. USG Ceilings: : USG.com.
 - 3. CertainTeed Corporation: www.certainteed.com.
- B. Acoustical Panels Type ACT-1: Painted mineral fiber, ASTM E 1264 Type III, provided under alternate bid, with the following characteristics:
 - 1. Size: 24 by 24 inches (600 by 600 mm).
 - 2. Thickness: 3/4 inches (19 mm).
 - 3. Surface Color: White.
 - 4. Products:
 - a. Substitutions: See Section 01 6000 - Product Requirements.
 - b. Cortega 770 by Armstrong.

2.02 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.

2. Chicago Metallic Corporation: www.chicagometallic.com.
3. USG: www.usg.com.
- B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
 1. Profile: Tee; 15/16 inch (24 mm) wide face.
 2. Finish: White painted.

2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch (2 mm) galvanized steel wire.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C 636/C 636M, ASTM E 580/E 580M, ASTM C 636/C 636M, ASTM E 580/E 580M, ASTM C 636/C 636M, and ASTM E 580/E 580M and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- F. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.
- G. Do not eccentrically load system or induce rotation of runners.

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 1. Cut to fit irregular grid and perimeter edge trim.

3.04 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

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**SECTION 09 6500
RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Luxury vinyl tile flooring.
- B. Resilient base.
- C. Installation accessories.

1.02 REFERENCE STANDARDS

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.
- B. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2013a.
- C. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.

1.03 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. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Flooring Material: 50 square feet (4.6 square meters) of each type and color.
 - 2. Extra Wall Base: 120 linear feet (36.6 linear meters).

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

PART 2 PRODUCTS

2.01 TILE FLOORING

- A. Luxury Vinyl Tile - Mohawk Group Hot & Heavy II Collection: Taking Root.
 - 1. Manufacturers:
 - a. Mohawk Group; www.mohawkgroup.com.
 - 2. Size: 18" x 36"
 - 3. Total Thickness: 2.5 mm
 - 4. Pattern: To be determined by Architect.
 - 5. Color: 868A Bark

2.02 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
 - 1. Manufacturers:
 - a. Burke Flooring; Commercial Wall Base - TS: www.burkeflooring.com/#sle.
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
 - c. Roppe Corp: www.roppe.com/#sle.
 - 2. Height: 4 inch (100 mm).
 - 3. Thickness: 0.125 inch (3.2 mm).
 - 4. Finish: Satin.
 - 5. Length: Roll.

6. Color: To be selected by Architect from manufacturer's standard range.
7. Accessories: Premolded external corners to be used at any locations where the return is less than 2 inch.

2.03 ACCESSORIES

- A. Primers and Adhesives: Waterproof; As recommended by wall base manufacturer.
- B. Transition Strips: same material and color as wall base.
- C. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 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.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 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.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of site 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.
 3. Set flooring in place, press with heavy roller to attain full adhesion.
- 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.

3.04 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.
- C. Install square tile to monolithic pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

- D. Install loose-laid tile, fit interlocking edges tightly.

3.05 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.
- B. Miter internal corners. At external corners, use premolded units. At returns less than 2 inches, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

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

END OF SECTION

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**SECTION 09 6700
FLUID-APPLIED FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fluid-applied flooring and base.

1.02 REFERENCE STANDARDS

- A. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.03 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 and colors available.
- C. Samples: Submit two samples, () 6" x 6" in size illustrating color and pattern for each floor material for each color specified.
- D. Samples: Submit selection samples illustrating color and pattern for color selection.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section.
 - 1. Minimum five years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fluid-Applied Flooring:
 - 1. SPARTACOTE, a division of LATICRETE International, Inc: www.laticrete.com/#sle.
 - 2. Sherwin-Williams Company: www.protective.sherwin-williams.com/#sle.

2.02 FLUID-APPLIED FLOORING SYSTEMS

- A. Fluid-Applied Flooring: Polyaspartic aliphatic polyurea resin; with aggregate.
 - 1. Self-Leveling Primer Coat(s): Pigmented base coat.
 - 2. System Thickness: 20 mils (___ mm), nominal, dry film thickness (DFT).
 - 3. Broadcast Aggregate: Vinyl flakes.
 - 4. Texture: Orange peel.
 - 5. Top Coat: Clear Gloss Top Coat.
 - 6. Color: As selected by Architect.
 - 7. Products:
 - a. SPARTACOTE; Sparta-Chip: www.laticrete.com/our-products/resinous-and-decorative-finishes.
 - b. Sherwin-Williams; Elladur 4850: www.industrial.sherwin-williams.com
 - c. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. Base Caps: Zinc with projecting base of 1/8 inch (3 mm); gray color.
- B. Cant Strips: Molded of flooring resin material.
- C. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.
- D. Primer: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.

3.02 PREPARATION

- A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- B. Prepare concrete surfaces according to ICRI 310.2R.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.
- E. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - ACCESSORIES

- A. Install cant strips at base of walls where flooring is to be extended up wall as base.
- B. Install terminating cap strip at top of base; attach securely to wall substrate.

3.04 INSTALLATION - FLOORING

- A. Apply in accordance with manufacturer's instructions.
- B. Apply each coat to minimum thickness required by manufacturer.
- C. Finish to smooth level surface.
- D. Cove at vertical surfaces.

3.05 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Protect flooring until final acceptance.

END OF SECTION

**SECTION 09 6813
TILE CARPETING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Carpet tile, fully adhered.
- B. Removal of existing sheet carpeting.

1.02 REFERENCE STANDARDS

- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016.
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.
- C. CRI 104 - Standard for Installation of Commercial Carpet; 2015.

1.03 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. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.05 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Tile Carpeting: Tufted, manufactured in one color dye lot.
 - 1. Product: Intrinsic Modular (Style 7096) manufactured by J+J Flooring Group.
 - 2. Tile Size: 24 by 24 inch (600 by 600 mm), nominal.
 - 3. Color: 2717 Authentic.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Transition strips: As specified in Section 09 6500.
- C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.01 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.

3.02 PREPARATION

- A. Remove existing carpet.
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Vacuum clean substrate.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in monolithic pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Trim carpet tile neatly at walls and around interruptions.
- G. Complete installation of edge strips, concealing exposed edges.

3.04 INSTALLATION ON STAIRS

- A. Use one piece of carpet for each tread and the riser below. Apply seam adhesive to all cut edges.
- B. Lay carpet with pile direction in the length of the stair.
- C. Adhere carpet tight to stair treads and risers.

3.05 CLEANING

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

END OF SECTION

**SECTION 09 9000
PAINTING AND COATING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish all new or altered interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Floors, unless specifically so indicated.
 - 6. Glass.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames
- B. Section - : Shop-primed items.
- C. Section 092116 - Gypsum Board Assemblies.

1.03 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

1.04 SUBMITTALS

- A. See Section , for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
- C. Samples: Submit 2 paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
- D. Manufacturer's Instructions: Indicate .
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Paint and Coatings: 1 gallon (4 L) of each color; store where directed.
 - 2. Label each container with in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

- C. Paint Materials: Store at minimum ambient temperature of and a maximum of , in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide lighting level of measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Behr Process Corporation: www.behr.com/#sle.
 - 2. Diamond Vogel Paints: www.diamondvogel.com/#sle.
 - 3. Benjamin Moore & Co: www.benjaminmoore.com/#sle.
 - 4. PPG Paints: www.ppgpaints.com/#sle.
 - 5. Pratt & Lambert Paints: www.prattandlambert.com/#sle.
 - 6. Sherwin-Williams Company: www.sherwin-williams.com, no substitutions.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Block Fillers: Same manufacturer as top coats.
- E. Substitutions:

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
 - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 4. Supply each coating material in quantity required to complete entire project's work from a single production run.
 - 5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

2.03 PAINT SYSTEMS - INTERIOR

- A. Ferrous Metals, Primed, Latex, 2 Coat - Hollow Metal Doors & Frames & Handrails:
 - 1. Touch-up with latex primer.
 - 2. Semi-gloss: Two coats of latex enamel
 - 3. Color: To be selected by Architect from Manufacturer's standard range.
- B. All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including .
 - 1. and one coat primer.

2. Primer(s): As recommended by manufacturer of top coats.
- C. Gypsum Board, Epoxy Enamel, 3 Coat:
 1. One coat of catalyzed epoxy primer.
 2. Eggshell: Two coats of catalyzed epoxy enamel.
- D. Gypsum Board/Plaster, Latex, 3 Coat:
 1. One coat of primer sealer.
 2. Eggshell: Two coats of latex enamel.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: filler.
- C. Fastener Head Cover Material: filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing coatings that exhibit surface defects.
- D. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of and bleach. Rinse with clean water and allow surface to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- I. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- J. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- K. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution,

ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

- L. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- M. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Sand metal surfaces lightly between coats to achieve required finish.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 SCHEDULE - COLORS

- A. P1: Typical Walls: Up to two colors to be selected.
- B. P2: Typical Gyp BD Ceilings: To be selected
- C. Hollow Metal Doors and Frames: Up to two colors to be selected.

END OF SECTION

**SECTION 10 1400
SIGNAGE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Room signs.

1.02 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - 1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
 - 2. Submit for approval by Owner through Architect prior to fabrication.
- D. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Flat Signs:
 - 1. Advanced Engraving, Fargo, ND
 - 2. Engraphix, Fargo, ND
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs:
 - 1. Sign Type: signs with panel media as specified.
 - 2. Provide "tactile" signage, with letters raised minimum and Grade II braille.
 - 3. Use engraved panel signs as specified.
 - 4. Character Height:
 - 5. Sign Size: 8x8 inches (____ mm), unless otherwise indicated.
 - 6. Thickness: 1/8".
 - 7. Mounting: Adhesive foam tape.
 - 8. Panel Edge: Square.
 - 9. Panel Corner: Square.
 - 10. Conference Room, Class Room, and Office Doors: Identify with room names and numbers to be determined later, not those indicated on drawings; in addition, provide

"window" section for replaceable occupant name. Verify rooms names and numbers with Owner.

11. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings. Verify room names and numbers with Owner.
12. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", and braille.

2.03 SIGN TYPES

- A. Flat Signs: Signage media frame.
 1. Edges:
 2. Corners:
 3. Clear Cover: For customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, non-glare on front.
 4. Wall Mounting of One-Sided Signs:
- B. Color and Font: Unless otherwise indicated:
 1. Character Font:
 2. Character Case:
 3. Background Color:
 4. Character Color: color.
 5. Sign Panels: Screen printed aluminum.
 6. Sign Posts: Galvanized U-posts.

2.04 ACCESSORIES

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs where indicated:
 1. Room and Door Signs: Locate on wall at latch side of door with centerline of sign at 60 inches (1525 mm) above finished floor.
 2. If no location is indicated obtain Owner's instructions.
- D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

3.03 ROOM SIGNAGE SCHEDULE:

- A. Provide a sign for each interior door including existing doors.

END OF SECTION

SECTION 10 2113.19
PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid plastic toilet compartments.
- B. Urinal screens.

1.02 RELATED REQUIREMENTS

- A. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- D. Samples: Submit two samples of partition panels, 6 X 6 inch (____ by ____ mm) in size illustrating panel finish, color, and sheen.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Solid Plastic Toilet Compartments:
 - 1. Ampco Products, Inc: www.ampco.com/#sle.
 - 2. ASI Accurate Partitions: www.asi-accuratepartitions.com/#sle.
 - 3. Scranton Products; Hiny Hiders Partitions: www.scrantonproducts.com/#sle.
 - 4. Substitutions: Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Toilet Compartments: Solid molded high density polyethylene (HDPE) plastic panels, doors, and pilasters, floor-mounted headrail-braced.
 - 1. Color: Selected by Architect from Manufacturer's full range..
- B. Door and Panel Dimensions:
 - 1. Thickness: 1 inch (25 mm).
 - 2. Door Width: 24 inch (610 mm).
 - 3. Height: 55 inch (____ mm).
 - 4. Thickness of Pilasters: 1 inch (25 mm).
- C. Urinal Screens: Wall-mounted with continuous panel brackets.

2.03 ACCESSORIES

- A. Pilaster Brackets: Polished stainless steel.
- B. Wall Brackets: Continuous type, satin stainless steel.
- C. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.
- D. Hinges: Stainless steel, manufacturer's standard finish.
 - 1. Continuous-type hinge, self closing.
- E. Door Hardware: Stainless steel; satin finish.
 - 1. Door Latch: Slide type with exterior emergency access feature. Continuous.
 - 2. Provide door pull for outswinging doors.
- F. Coat Hook: One per compartment, mounted on door.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.

3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 inch to 1/2 inch (9 mm to 13 mm) space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch (6 mm).
- B. Maximum Variation From Plumb: 1/8 inch (3 mm).

3.04 ADJUSTING

- A. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- B. Adjust adjacent components for consistency of line or plane.

END OF SECTION

**SECTION 10 2601
WALL AND CORNER GUARDS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.

1.02 RELATED REQUIREMENTS

- A. Section 09 2116 - Gypsum Board Assemblies.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wall Protection
 - 1. Construction Specialties, Inc : www.c-sgroup.com.
 - 2. Inpro: www.inprocorp.com/#sle.
 - 3. Koroguard Wall Protection Systems: <https://koroseal.com/products/wall-protection>.

2.02 COMPONENTS

- A. Corner Guards - Surface Mounted:
 - 1. Material: Polyethylene terephthalate (PET or PETG); PVC-free with full height extruded aluminum retainer.
 - 2. Width of Wings: 3 inches (76 mm).
 - 3. Corner: Radiused.
 - 4. Color: To be selected by Architect from Manufacturer's full range..
 - 5. Height: nominal 4 feet.

2.03 FABRICATION

- A. Fabricate components with tight joints, corners and seams.
- B. Form end trim closure by capping and finishing smooth.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guard 4 inches above finished floor.

END OF SECTION

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**SECTION 10 2800
TOILET, BATH, AND LAUNDRY ACCESSORIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Grab Bars

1.02 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
- C. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- E. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Commercial Toilet, Shower, and Bath Accessories:
 - 1. AJW Architectural Products: www.ajw.com/#sle.
 - 2. American Specialties, Inc: www.americanspecialties.com/#sle.
 - 3. Bradley Corporation: www.bradleycorp.com/#sle.
 - 4. Georgia-Pacific Professional: www.blue-connect.com/#sle.

2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Stainless Steel Sheet: ASTM A666/A666M, Type 304.
- C. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- D. Adhesive: Two component epoxy type, waterproof.
- E. Fasteners, Screws, and Bolts: Hot dip galvanized.

2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Double roll, surface mounted bracket type, chrome-plated zinc alloy brackets.
 - 1. Products:
 - a. Georgia-Pacific Compact Side-by-Side, SKU#56783/56784.
- B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator.
 - 1. Capacity: 300 C-fold minimum.
- C. Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gauge refill indicator, tumbler lock.
 - 1. Minimum Capacity: 48 ounces (1.5 liters).
- D. Mirrors: Stainless steel framed, 1/4 inch (6 mm) thick tempered safety glass; ASTM C1048.
 - 1. Frame: 0.05 inch (1.3 mm) angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 - 2. Backing: Full-mirror sized, minimum 0.03 inch (0.8 mm) galvanized steel sheet and nonabsorptive filler material.
 - 3. Mounting: Concealed
 - 4. Products:
 - a. Bradley Model 812.
- E. Grab Bars: Stainless steel, smooth surface.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
 - b. Dimensions: 1-1/4 inch (32 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
 - c. Length and Configuration: As indicated on drawings.
- F. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

3.02 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Mounting Heights: As indicated on drawings.

END OF SECTION

SECTION 10 4400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.02 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2017.

1.03 SUBMITTALS

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Activar Construction Products Group, Inc. - JL Industries; Cosmic Extinguisher - Multipurpose Chemical: www.activarcpg.com/#sle.
 - 2. Ansul, a Tyco Business: www.ansul.com/#sle.
 - 3. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
 - 4. Nystrom, Inc: www.nystrom.com/#sle.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Class: A:B:C type.
 - 2. Size: 10 pound (4.54 kg).

2.03 FIRE EXTINGUISHER CABINETS

- A. Cabinet Construction: Non-fire rated.
 - 1. Formed primed steel sheet; 0.036 inch (0.9 mm) thick base metal.
- B. Cabinet Configuration: Semi-recessed type.
 - 1. Size to accommodate accessories.
 - 2. Trim: Flat square edge, with 1-1/2" wide face.
- C. Door: 0.036 inch (0.9 mm) metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.
- D. Door Glazing: Acrylic plastic, clear, 1/8 inch (3 mm) thick, flat shape and set in resilient channel glazing gasket.
- E. Fabrication: Weld, fill, and grind components smooth.
- F. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.
- G. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated.
- B. Lettering: FIRE EXTINGUISHER decal, or vinyl self-adhering, pre-spaced black lettering in accordance with authorities having jurisdiction (AHJ).

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers in cabinets.

END OF SECTION

**SECTION 12 2113
HORIZONTAL LOUVER BLINDS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Horizontal slat louver blinds.
- B. Operating hardware.

1.02 REFERENCE STANDARDS

- A. WCMA A100.1 - Safety of Window Covering Products; 2018.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating physical and dimensional characteristics.
- C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- 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. Extra Blind Assemblies: One of each size.
 - 3. Extra Slats: 10 of each type and size.
 - 4. Extra Lift Cords, Control Cords, and Wands: One of each type.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Horizontal Louver Blinds Without Side Guides:
 - 1. Hunter Douglas Architectural; CD Model: www.hunterdouglasarchitectural.com/#sle.
 - 2. SWFcontract, a division of Spring Window Fashions, LLC: www.swfcontract.com/#sle.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.

2.02 BLINDS WITHOUT SIDE GUIDES

- A. Description: Horizontal slat louvers hung from full-width headrail with full-width bottom rail.
- B. Manual Operation: Control of raising and lowering by cord with full range locking; blade angle adjustable by control wand.
- C. Metal Slats: Spring tempered pre-finished aluminum; square slat corners, with manufacturing burrs removed.
 - 1. Width: 1/2 inch (12 mm).
 - 2. Thickness: 0.008 inch (0.20 mm).
 - 3. Color: As selected by Architect.
- D. Slat Support: Woven polypropylene cord, ladder configuration.
- E. Head Rail: Pre-finished, formed aluminum box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.
- F. Bottom Rail: Pre-finished, formed steel; with end caps.
 - 1. Color: Same as headrail.
- G. Lift Cord: Braided nylon; continuous loop; complying with WCMA A100.1.
 - 1. Free end weighted.
 - 2. Color: As selected by Architect.
- H. Control Wand: Extruded hollow plastic; hexagonal shape.

1. Non-removable type.
2. Length of window opening height less 3 inch (76 mm).
3. Color: As selected by Architect.

- I. Headrail Attachment: Wall brackets.

2.03 FABRICATION

- A. Determine sizes by field measurement.
- B. Fabricate blinds to cover window frames completely.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with flush countersunk fasteners.

3.02 TOLERANCES

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch (6 mm).
- B. Maximum Offset From Level: 1/8 inch (3 mm).

3.03 ADJUSTING

- A. Adjust blinds for smooth operation.

3.04 CLEANING

- A. Clean blind surfaces just prior to occupancy.

3.05 SCHEDULE

- A. All interior windows.

END OF SECTION

**SECTION 12 3600
COUNTERTOPS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Countertops for architectural cabinet work.
- B. Wall-hung counters and vanity tops.

1.02 RELATED REQUIREMENTS

- A. Section 06 4100 - Architectural Wood Casework.

1.03 REFERENCE STANDARDS

- A. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 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. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- E. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 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.
- C. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

PART 2 PRODUCTS

2.01 COUNTERTOPS

- A. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.
 - 1. Laminate Sheet: NEMA LD3, Grade HGS, 0.045" +/- 0.005" nominal thickness.
 - a. Manufacturers:
 - 1) Wilsonart; silicon ev 4811-60: www.wilsonart.com/#sle.
 - b. Surface Color and Pattern: As selected by Architect from the manufacturer's full line.
 - 2. Exposed Edge Treatment: Postformed laminate; front edge substrate built up to minimum 1-1/4 inch (32 mm) thick with radiused edge, integral coved backsplash with radiused top edge. Where indicated on Drawings.

2.02 MATERIALS

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined. Urea-formaldehyde-free.

2.03 FABRICATION

- A. Fabricate in accordance with standards governing fabrication quality that is specified in Section 06 4100.
- B. 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 (25 mm) except where top butts against cabinet or wall.
 - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch (16 mm).
- C. Seal joint between back/end splashes and vertical surfaces.

3.02 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet (3 mm in 3 m), maximum.
- B. Offset From Wall, Countertops: 1/8 inch (3 mm) maximum; 1/16 inch (1.5 mm) minimum.
- C. Field Joints: 1/8 inch (3 mm) wide, maximum.

END OF SECTION

**SECTION 22 0100
PLUMBING GENERAL REQUIREMENTS**

PART 1 - GENERAL

1.01 APPLICABILITY

- A. The work covered by the Division of the Specifications consists of providing all labor, supervision, equipment, materials, all incidentals, related items and appurtenances, and performing all operations necessary to complete the installation of work in strict accordance with these specifications and drawings.
- B. All work shall be finished, tested, and ready for operation. The word "Provide" shall mean "furnish and install complete and ready for use".

1.02 DRAWINGS:

- A. The drawings indicate the extent and general layout of the mechanical systems intended for the building. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, connections, and accessories which may be required. Provide offsets, fittings, valves, and accessories as may be required, to produce a complete and operating installation of type shown and specified.
- B. Mechanical drawings are diagrammatic in nature and should not be scaled to obtain dimensions. Obtain dimensions and locations of partitions, walls, etc., from the Architectural dimensioned drawings. Consult the Architectural drawings for details of construction, location of suspended ceilings, ceiling heights, and other pertinent information. Architect's drawings shall not take precedence over field measurements.
- C. All drawings and specifications shall be considered in bidding. The drawings and specifications are complimentary, and what is called for in either of these shall be as binding as though called for by both. Should any conflict arise between drawings and specifications, such conflict shall be brought to the attention of the Architect.

1.03 SUBMITTALS

- A. All submittals to be reviewed, approved, and stamped by submitting contractor prior to submittal to engineer. Submittals not reviewed by submitting contractor prior to submittal to engineer will be returned marked "Not Reviewed".

1.04 APPROVED MANUFACTURERS

- A. Where approved manufacturers are indicated in the specifications, the approval does not relieve the responsibility of the contractor to provide products and systems which meet the requirements of the specifications and drawings.
- B. Performance, dimensions, electrical requirements, and functions shall be coordinated with the basis of design indicated on the drawings and in the specifications. If there are differences from the basis of design they should be brought to the attention of the Engineer.
- C. Revisions required by the differences from basis of design, shall be provided to the Owner without additional cost. Revisions to the work of other contractors on the project, due to differences in equipment, shall be provided by the contractor supplying the equipment at no additional cost to the Owner.

1.05 INSTRUCTION OF OWNER'S EMPLOYEES:

- A. Provide, without additional expense to the Owner, the services of competent instructors, who will give full instructions in the care, adjustment, and operation of all parts of the mechanical equipment to the Owner's employees who are to have charge of the equipment.
- B. An operating and maintenance manual shall be made available to the Owner's operating personnel during the instruction and left with the Owner upon completion of the instruction.

- C. Hours of instruction shall be divided up into a minimum of two (2) instruction periods. Provide a minimum of four (4) total hours of training for plumbing equipment and systems.

1.06 INSTALLATION OF EQUIPMENT:

- A. All appliances and equipment shall be installed and connected in accordance with manufacturer's instructions and recommendations unless such instructions are in conflict with these specifications.
- B. All equipment shall be installed in such a manner and location as to facilitate accessibility for maintenance and/or replacement.

1.07 COOPERATION WITH OTHER TRADES:

- A. Cooperate with other trades so as to avoid interferences. Where required to avoid interferences with other work or to increase the headroom, the Contractor shall off-set the piping and/or re-route the duct work where directed by the Engineer. Carefully check all construction details to assure the proper installation of all work under this specification. Schedule the work such that it will keep pace with the work of other crafts and cause no delay.

1.08 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 all of the existing conditions and limitations. No extras will be allowed because of Contractor's misunderstanding as to the amount of work involved or lack of his knowledge of any condition in connection with the new construction.

1.09 CODES, ORDINANCES, REGULATIONS, & STANDARDS:

- A. The entire installation shall be made in accordance with all state and local laws. If, in any instance, the plans and specifications conflict with such laws, the law shall take precedence. This, however, shall not be construed as relieving 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.
- B. All work shall conform to applicable state and local codes, ordinances, regulations, and/or standards.

1.10 PERMITS, LICENSES AND FEES

- A. The contractor shall secure and pay for all the associated 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.

1.11 CONTRACTOR WARRANTIES

- A. Contractor shall guarantee all equipment, materials, and workmanship for a period of one year from the date of final completion. Any defects in equipment, materials or workmanship that appear or cause any issues within the one year period shall be repaired at no additional cost, (this shall include materials and labor). Refer to all other specification sections for additional guarantees/warranties requirements.

PART 2 - PRODUCTS

2.01 OPERATION & MAINTENANCE MANUALS

- A. Refer to front end specifications for O&M requirements.
- B. Manual shall include an index in the front of each manual for the sections included in the manual. Each section shall be referenced with plastic tabs.

- C. Include in the front of each manual a complete listing of all mechanical contractors and sub-contractors used on the project. Include names, addresses and phone numbers for each contracted listed.
- D. Manuals shall be arranged by specification number. Each piece of equipment shall be referenced by tag number with tabs. At the beginning of each section, the equipment supplier's name, address and phone number shall be provided.
- E. Data for equipment included in the manuals:
 - 1. Approved shop drawings clearly showing the models, sizes and capacities of equipment used. All shop drawings included in the manual shall have all review comments addressed.
 - 2. Operations Manuals detailing step by step procedures for putting equipment into operation.
 - 3. Maintenance Manuals from the manufacturer of each piece of equipment including instructions for installation, maintenance and lubrication. Manuals shall include parts lists for all replacement parts.
 - 4. All equipment warranty information with warranty registration completed in owners name.
- F. Include the following reports in the manuals:
 - 1. Testing and balancing reports for air and water systems as specified.
 - 2. Start-up reports.
 - 3. Valve and damper tag lists.
- G. Submit one hard copy of the Operation & Maintenance Manuals to the Engineer and the Contracting Officer for approval prior to delivery to the Owner.

2.02 SUPPORTING STEEL, ROOF AND WALL OPENINGS:

- A. Provide structural steel framework for supporting mechanical equipment as required.
- B. Unless otherwise indicated by the drawings, lintels for new mechanical openings shall be provided by the contractor installing the pipe.
- C. Unless otherwise indicated by the drawings, angles to frame a new roof opening through the roof deck shall be provided by the contractor installing the pipe through the roof.
- D. All steel work shall be in conformance with the requirement of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. Material shall conform to ASTM A36.

2.03 SLEAVES, CUTTING, AND CORE DRILLING:

- A. Provide sleeves for piping openings in masonry walls.
- B. The contractor shall saw cut or core drill existing masonry floors and walls for new piping penetrations. The contractor shall cut new openings through framed walls for piping penetrations. Provide headers as needed in frame walls.

2.04 FIRESTOPPING

- A. Provide firestopping assemblies for the required fire ratings and listed in the current year certification books of UL, FM or ITS (Warnock Hersey).
- B. See the Architectural drawings for required ratings. Refer to the Mechanical drawings for additional ratings. Provide firestopping for all penetrations of these assemblies.

2.05 SEALING PENETRATIONS IN NON-RATED WALLS AND FLOORS

- A. Provide caulk at penetrations of non-rated walls and floors for piping. If the gap is too large for caulk, provide fiberglass insulation for backing. Conceal the fiberglass with either caulk or sheetmetal. Refer to specifications for sleeve requirements.

- B. In mechanical rooms and other water-proof floor areas, provide sleeves or concrete pads at least 2" higher than the top of slab to prevent water from running through the annular space between the pipe and the floor opening. In addition to the sleeve, provide packing and caulking around the pipe inside the sleeve to prevent noise transmission through openings in the floor.

2.06 ACCESS DOORS IN CEILINGS AND WALLS

- A. Provide metal lockable access doors in gypsum board ceilings and walls where needed for access to dampers or valves. Coordinate the installation of the access doors with the ceiling contractor. Confirm the location of the panels with the Architect. Provide rated doors where required, refer to architects plans for rated walls/ceilings.

2.07 TRENCHING, BACKFILL AND COMPACTION

- A. As a minimum requirement, the fill shall be either subsoil excavated on-site or engineered fill. The fill shall be free of lumps larger than 3 inches, rocks larger than 2 inches, frozen or spongy and wet material not capable of compaction in place.

PART 3 - EXECUTION

3.01 FIRESTOPPING INSTALLATION

- A. Verify openings are ready to receive the firestopping. Modify the openings as required to accommodate the requirements for the certified assembly drawing for the firestopping material.
- B. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- C. Remove incompatible materials that could adversely affect bond.

3.02 TRENCHING, BACKFILL AND COMPACTION

- A. Compact to minimum of 95 percent of maximum dry density. Cut out soft areas and backfill. Do not fill with frozen materials. Place and compact in layers not exceeding 8 inches compacted depth. Correct areas that are over-excavated. Maintain moisture content of fill materials to obtain compaction density.

END OF SECTION

**SECTION 22 0110
PLUMBING DEMOLITION**

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Contract documents and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections apply to this section.
- B. This section specifies the demolition and removal of all plumbing equipment and distribution conduits including but not limited to piping, controls, insulation, plumbing fixtures and accessories in existing building.
- C. Unless otherwise noted in the Documents, all salvage items removed in connection with this Contract are to become the property of the Contractor, however the Owner shall have the first right of refusal on all equipment removed.

1.02 SUBMITTALS:

- A. Proposed Dust Control and Noise Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- B. Schedule of selective demolition activities:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of building utility services.
 - 3. Coordination for shutoff, capping and continuation of services.
 - 4. Coordination of Owner's continued occupancy of portions of existing building and of Owner's occupancy of completed work.
- C. Pre-demolition photographs or videotape showing existing pre-demolition conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before demolition work begins.

1.03 PROJECT CONDITIONS:

- A. Owner will occupy portions of the building immediately adjacent to selective demolition area. Conduct demolition so Owner's operation will not be disturbed. Provide not less than 48 hours notice to Owner of activities that will affect the Owner's operations.
- B. Maintain existing services to Owner occupied areas during demolition if possible or coordinate interruption of services prior to demolition.
- C. Owner assumes no responsibility for condition of area to be selectively demolished.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
- E. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Verify field measurements and piping arrangements are as shown on Drawings.

- B. Verify that abandoned equipment serves only abandoned facilities.
- C. Demolition drawings are based on causal field observation and existing record documents. The demolition Drawings are diagrammatic and show the general scope of demolition work and do not show all the construction detail of the original record drawings. Report discrepancies to the Project Engineer before disturbing existing installation.
- D. The Contractor shall visit the existing building and ground and review the existing building record drawings for details of existing installation to familiarize himself with existing conditions prior to submitting bid. No allowance will be made subsequently, in this connection, on behalf of the contractor for any error or negligence on his part.
- E. Beginning of demolition means the Contractor accepts existing conditions.

3.02 PREPARATION:

- A. Disconnect utilities in areas scheduled for removal. Notify Project Engineer and Owner of areas to be affected by plumbing demolition work prior to commencing.

3.03 SELECTIVE DEMOLITION AND EXTENSION OF EXISTING PLUMBING WORK:

- A. Demolish and remove from site, and extend existing mechanical work under provisions of this Division and as indicated on the Drawings unless otherwise noted.
- B. Salvage items noted to remain the property of the Owner shall be delivered to a location to be designated by the Owner. Contractor shall remove from construction areas all trash or debris as it accumulates and dispose of it off site at no additional cost to the Owner. All construction areas shall be kept clean, safe, and orderly at all times. At the completion and acceptance for work, Contractor shall remove from the site all debris and surplus materials resulting from this work and dispose of them off site at no additional cost to the Owner.
- C. Do not use cutting torches until work area is clear of flammable materials. At concealed spaces verify condition and contents of hidden space before starting flame cutting operations. Maintain Fire Watch and portable fire-suppression devices during flame-cutting operations. Maintain and evaluate ventilation during flame-cutting operations.
- D. Maintain ventilation for dust control during selective demolition process. Verify Owner requirements for dust control and conform to their standards for all demolition activities.
- E. Remove, relocate, and extend existing installations to accommodate new construction as required for proper installation and system operation.
- F. Remove all accessories above grade. When removing equipment or devices all associated pipe, wiring, etc. shall be removed and capped as required. Cut piping, tubing, etc. behind walls, above ceilings and below floors, and patch surfaces to match existing conditions. Finishes will be by others unless otherwise noted in documents.
- G. Neatly cut openings and holes plumb, square and true to dimension required. Use cutting methods least likely to damage construction to remain or adjoining construction. Cut and drill from exposed surfaces into concealed surfaces to avoid marring or spalling of finished surfaces. Temporarily cover openings to remain.
- H. Patch all openings created by removal of plumbing equipment, pipes, etc. unless noted as being patched by others. Openings to be patched to match existing with similar material and finish unless otherwise noted.
- I. Seal all existing roof penetrations, which will not be reused. Roof patching shall be the responsibility of the mechanical contractor.
- J. Remove, relocate or provide brackets, hangers, and other accessories as required.
- K. Repair adjacent construction and finished damaged during demolition and extension work.
- L. Maintain access to existing mechanical installations, which remain active.

3.04 CLEANING AND REPAIR:

- A. Clean and repair existing materials and equipment, which remain or are to be returned to the Owner.
- B. All building surfaces damaged and openings left by new Work or the removal or relocation of plumbing equipment, piping, etc., shall be repaired to original condition and painted by the Contractor.

END OF SECTION

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SECTION 22 0719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.

1.02 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019.
- B. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- E. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum five years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.06 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

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.02 GLASS FIBER

- A. Manufacturers:
 - 1. CertainTeed Corporation: www.certainteed.com.
 - 2. Johns Manville Corporation: www.jm.com.
 - 3. Knauf Insulation; Earthwool 1000 Degree Pipe Insulation: www.knaufinsulation.com/#sle.
 - 4. Owens Corning Corporation: www.ocbuildingspec.com.
- B. 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.
- 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.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 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.

3.03 SCHEDULES

- A. Plumbing Systems:
 1. Underground (Buried) Domestic Water; including hot, cold and recirculating.
 - a. Flexible Elastomeric Cellular Foam Insulation:

- 1) All pipe sizes: 1 inch
2. Domestic Hot Water Supply:
 - a. Glass Fiber Insulation:
 - 1) 1-1/4" and less: 1 inch
 - 2) 1 1/2" to 3": 1 1/2 inch
3. Domestic Hot Water Recirculation:
 - a. Glass Fiber Insulation:
 - 1) 1-1/4" and less: 1 inch
4. Domestic Cold Water:
 - a. Glass Fiber Insulation:
 - 1) 1-1/4" and less: 1 inch
 - 2) 1 1/2" to 3": 1 1/2 inch
 - 3) 4" and larger: 1 1/2 inch
5. Plumbing Vents Within 10 Feet of the Exterior:
 - a. Glass Fiber Insulation:
 - 1) All sizes: 1 inch

END OF SECTION

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**SECTION 22 1005
PLUMBING PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe, pipe fittings, specialties, and connections for piping systems.
 - 1. Sanitary sewer.
 - 2. Domestic water.
 - 3. Equipment drains and overflows.
 - 4. Flanges, unions, and couplings.
 - 5. Valves.
 - 6. Flow controls.

1.02 REFERENCE STANDARDS

- A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.
- C. ASME B31.9 - Building Services Piping; 2017.
- D. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- E. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.
- F. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012 (Reapproved 2018).
- G. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.
- H. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.
- I. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2016.
- J. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.
- K. MSS SP-69 - Pipe Hangers and Supports - Selection and Application; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2003.
- L. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.
- M. NSF 61 - Drinking Water System Components - Health Effects; 2020.
- N. NSF 372 - Drinking Water System Components - Lead Content; 2016.

1.03 SUBMITTALS

- A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
 - 1. Provide submittal for recirc valves showing size and temperature selection.
- B. Project Record Documents: Record actual locations of valves.

1.04 QUALITY ASSURANCE

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.06 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

2.02 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. PVC Pipe: ASTM D 2665
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.03 SANITARY SEWER PIPING, ABOVE GRADE

- A. PVC Pipe: ASTM D2665.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.04 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B 88 (ASTM B 88M), Type L (B), Drawn (H) is approved for all pipe sizes. Type M hard drawn copper tube is approved for pipe sizes 2" and larger.
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: Solder, lead free, 95-5 tin-antimony, or tin and silver.
 - 3. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
 - 4. Mechanical Press Sealed Fittings: Copper and copper alloy press fittings shall conform to material requirements of ASME B16.18 or ASME B16.22 and performance criteria of ASME B16.51 and IAPMO PS 117. Sealing elements for press fittings shall be EPDM. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer.
 - a. Manufacturers:
 - 1) Viega LLC: www.viega.us/#sle.

2.05 EQUIPMENT DRAINS AND OVERFLOWS

- A. Copper Tube: ASTM B 88 (ASTM B 88M), 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; ASTM B 32 lead-free solder, alloy Sn95 solder.
- B. PVC Pipe: ASTM D 1785, Schedule 40, or ASTM D 2241, SDR 21 or 26.
 - 1. Fittings: ASTM D 2466 or D2467, PVC.
 - 2. Joints: Solvent welded.
- C. PIPE SIZES SHOWN ON PLANS ARE MINIMUM REQUIRED PIPE SIZES. CONTRACTOR SHALL UPSIZE PIPING TO MATCH DRAIN PAN CONNECTION AS REQUIRED. CONDENSATE PIPING SHALL NOT BE DOWNSIZED FROM DRAIN PAN CONNECTION TO DRAIN.

2.06 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.
- C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.07 BALL VALVES

- A. Manufacturers:
 - 1. Apollo Valves: www.apollovalves.com/#sle.
 - 2. Nibco, Inc: www.nibco.com
 - 3. Viega LLC: www.viega.us
 - 4. Milwaukee.
 - 5. Stockham
 - 6. Jomar
- B. Construction, 4 Inches and Smaller: MSS SP-110, Class 150, 400 psi CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, full port, teflon seats and stuffing box ring, blow-out proof stem, lever handle solder, threaded or grooved ends with union.

2.08 THERMOSTATIC RECIRCULATION VALVES

- A. Manufacturers:
 - 1. Therm-Omega-Tech model CSUA.
 - 2. B&G Temp Setter.
- B. Construction: Stainless steel body and internal components certified to NSF/ANSI 61 for Drinking Water System Components. Spring operated, thermostatically actuated controlled recirculation valve for domestic hot water piping. The valve shall be self-contained and fully automatic with unions and isolation valves. Contractors option to provide recirculation valve with field installed union and isolation valves.
- C. Valves shall be line size with 115 degrees F temperature setpoint.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 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.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Provide access panels where valves and fittings are not exposed. Coordinate with general contractor.
- D. PVC solvent welded joints shall be made using a primer of contrasting color.

- E. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- F. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- G. Group piping whenever practical at common elevations.
- H. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- J. Provide handle stand-off extensions on valves to provide a minimum of 3/4" clearance between valve handle and piping insulation.
- K. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- L. Install bell and spigot pipe with bell end upstream.
- M. Install valves with stems upright or horizontal, not inverted.
- N. Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood. Where code allows vent limiting devices, they may be used in lieu of venting the regulator to the outdoors.
- O. Provide primer and exterior paint of color selected by the Architect on all gas piping and devices outside the building.
- P. Install water piping to ASME B31.9.
- Q. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- R. Press connections: copper and copper alloy press connections shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.
- S. 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.
- T. Pipe Hangers and Supports:
 - 1. Install in accordance with MSS SP-58 and local code requirements.
 - 2. Hanger spacing and application shall be in accordance with MSS SP-69 and local code requirements.
 - 3. Provide oversized hangers on insulated pipe to allow insulation at full thickness to be provided on the piping.
 - 4. Support horizontal piping as required by code.
 - 5. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 6. Place hangers within 12 inches of each horizontal elbow.
 - 7. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

8. Support vertical piping at every floor and as required by code. Support riser piping independently of connected horizontal piping.
9. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
10. Provide copper plated hangers and supports for copper piping.
11. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
12. Support cast iron drainage piping at every joint.
13. Provide hangers and supports as required by local code and authority having jurisdiction.

3.04 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. Install ball valves for throttling, bypass, or manual flow control services.

3.05 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 pipes. Only where site conditions preclude this slope, pipes 4" and larger may be sloped at 1/8 inch per foot where first approved by the Authority Having Jurisdiction.
- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Disinfect water distribution system in accordance with the Plumbing Code.

3.07 PRESSURE TESTING OF PLUMBING PIPING SYSTEMS

- A. Pressure test all plumbing piping systems in accordance with the Plumbing and Fuel Gas Code.

END OF SECTION

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**SECTION 22 1006
PLUMBING PIPING SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Drains.
- B. Cleanouts.
- C. Water hammer arrestors.

1.02 REFERENCE STANDARDS

- A. ASME A112.6.3 - Floor and Trench Drains; 2019.
- B. NSF 61 - Drinking Water System Components - Health Effects; 2020.
- C. NSF 372 - Drinking Water System Components - Lead Content; 2016.
- D. PDI-WH 201 - Water Hammer Arresters; 2017.

1.03 SUBMITTALS

- A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- B. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

1.06 EXTRA MATERIALS

- A. Supply for Owner's use in maintenance of project:
 - 1. Two loose keys for outside hose bibbs.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 DRAINS

- A. Manufacturers:
 - 1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
 - 2. Josam Company: www.josam.com.
 - 3. Wade: www.wadedrains.com.
 - 4. Watts: www.watts.com.
 - 5. Zurn Industries, LLC: www.zurn.com/#sle.
 - 6. Mifab
- B. Floor Drain (FD-1):
 - 1. Model: Zurn Z415.
 - 2. Description: Cast iron body with bottom outlet, combination invertible membrane clamp, adjustable collar, and seepage slots. Provide with polished nickel bronze strainer.

2.03 CLEANOUTS

- A. Manufacturers:
 - 1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.

2. Josam Company: www.josam.com.
 3. Wade: www.wadedrains.com.
 4. Watts: www.watts.com.
 5. Zurn Industries, LLC: www.zurn.com.
- B. Cleanout (CO):
1. Model: Zurn ZN1400.
 2. Description: Adjustable floor cleanout, cast iron body.
 3. Cover: Round, Polished Nickel Bronze finish.
- C. Cleanout (WCO):
1. Model: Zurn Z1446.
 2. Description: Wall cleanout, cast iron body.
 3. Cover: Round, smooth stainless steel wall access cover.

2.04 WATER HAMMER ARRESTORS

- A. Water Hammer Arrestors:
1. Copper construction, bellows or piston type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F and maximum 250 psi working pressure. ASSE 1010 certified water hammer arrestor, designed or provide continous protection with maintaince.
 2. Provide size and quantity of water hammer arrestors as recommended by manfucaturer for the plumbing fixtures it is serving.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Install floor cleanouts at elevation to accommodate finished floor.
- D. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatory sinks or washing machine outlets.
- E. Install water hammer arrestors complete with accessible isolation valve on cold water piping to each group of fixtures (washroom).

END OF SECTION

**SECTION 22 3000
PLUMBING EQUIPMENT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. In-line circulator pumps.

1.02 SUBMITTALS

- A. Product Data:
- B. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- C. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.03 QUALITY ASSURANCE

- A. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.05 WARRANTY

- A. Provide three year manufacturer warranty for commercial domestic water heaters.
- B. Provide one year manufacturer warranty for residential domestic water heaters, installed in commercial applications.

PART 2 PRODUCTS

2.01 IN-LINE CIRCULATOR PUMPS

- A. Manufacturers:
 - 1. Bell & Gossett, a xylem brand; _____: www.bellgossett.com/#sle.
 - 2. Taco.
 - 3. Grundfos
- B. Casing: Bronze, rated for 150 psi working pressure, with stainless steel rotor assembly.
- C. Impeller: non-ferrous.
- D. Shaft: Ceramic.
- E. Bearings: Double-sintered carbon.
- F. Seal: Carbon rotating against a stationary ceramic seat.

2.02 SUMP BASINS

- A. Description: Round, fiberglass sump basin by Topp Industry or equivalent manufacturer. See plans for diameters and depths of basins.
- B. Cover: Steel, gasketed cover with 10 inch inspection port.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.
- B. Coordinate with plumbing piping and related fuel piping work to achieve operating system.

END OF SECTION

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**SECTION 22 4000
PLUMBING FIXTURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water closets.
- B. Urinals.
- C. Lavatories.
- D. Sinks.
- E. Electric water coolers.

1.02 REFERENCE STANDARDS

- A. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
- B. ASME A112.18.1 - Plumbing Supply Fittings; 2018.
- C. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2018.
- D. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2017.
- E. NSF 61 - Drinking Water System Components - Health Effects; 2020.
- F. NSF 372 - Drinking Water System Components - Lead Content; 2016.

1.03 SUBMITTALS

- A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- B. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Faucet Washers: One set of each type and size.
 - 2. Extra Toilet Seats: One of each type and size.
 - 3. Flush Valve Service Kits: One for each type and size.

1.04 QUALITY ASSURANCE

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

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 PRODUCTS

2.01 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.

2.02 FLUSH VALVE WATER CLOSETS

- A. Water Closet Manufacturers:
 - 1. American Standard Inc: www.americanstandard.com.
 - 2. Sloan
 - 3. Zurn industries, Inc: www.zurn.com
 - 4. Kohler Company: www.kohlerco.com.
 - 5. Vitra: www.vitra-usa.com.
- B. Water Closet (WC-1):
 - 1. Model: American Standard 3043.001.
 - 2. Description: ADA compliant, vitreous china, 1.6 gpf, floor-mounted elongated bowl, 1 1/2 inch top spud water closet.
 - 3. Mounting height: 17 inches from finished floor to rim.
 - 4. Water Supply: 1 inch cold water connection.
 - 5. Flush Valve: Exposed Manual
 - a. Model: Sloan 111
 - b. Description: Exposed chrome plated, diaphragm type with oscillating handle, integral screwdriver stop, vandal resistant stop cover and vacuum breaker; maximum 1.6 gallon flush volume.
- C. Water Closet (WC-2):
 - 1. Model: American Standard 2234.001.
 - 2. Description: Vitreous china, 1.6 gpf, floor-mounted elongated bowl, 1 1/2 inch top spud water closet.
 - 3. Mounting height: 14 1/8 inches from finished floor to rim.
 - 4. Water Supply: 1 inch cold water connection.
 - 5. Flush Valve: Exposed Manual
 - a. Model: Sloan 111
 - b. Description: Exposed chrome plated, diaphragm type with oscillating handle, integral screwdriver stop, vandal resistant stop cover and vacuum breaker; maximum 1.6 gallon flush volume.
- D. Flush Valves: ASME A112.18.1, diaphragm type, complete with vacuum breaker stops and accessories.
 - 1. Manufacturers:
 - a. Delany Products: www.delanyproducts.com/#sle.
 - b. Sloan Valve Company: www.sloanvalve.com/#sle.
 - c. Zurn Industries, Inc: www.zurn.com/#sle.
 - d. American Standard, Inc: www.americanstandard-us.com
- E. Seats:
 - 1. Manufacturers:
 - a. Bemis Manufacturing Company: www.bemismfg.com.
 - b. Church Seat Company: www.churchseats.com.
 - c. Olsonite: www.olsonite.com.
 - d. Zurn Industries, Inc: www.zurn.com.
 - e. Centoco: www.centoco.com.
 - f. Beneke: www.sppi.com
 - 2. Solid white plastic, elongated, open front, extended back, self-sustaining hinge, brass bolts, without cover.
- F. Refer to architects elevation for mounting height.

2.03 WALL HUNG URINALS

- A. Urinal Manufacturers:
 - 1. Kohler Company: www.kohler.com.
 - 2. Zurn Industries, Inc: www.zurn.com/#sle.
 - 3. Sloan
 - 4. American Standard, Inc: www.americanstandard-us.com
 - 5. Vitra: www.vitra-usa.com.
- B. Urinal (U-1):
 - 1. Model: American Standard 6590.001
 - 2. Description: ADA compliant, vitreous china, wall hung washout urinal, with integral trap and 3/4 inch top spud.
 - 3. Mounting height: Refer to architects elevation for mounting height.
 - 4. Water Supply: 3/4 inch cold water connection.
 - 5. Flush Valve: Exposed Manual
 - a. Model: Sloan 186-0.5
 - b. Description: Exposed chrome plated, diaphragm type with oscillating handle, integral screwdriver stop, vandal resistant stop cover, vacuum breaker; maximum 0.5 gallon flush volume
- C. Flush Valve Manufacturers:
 - 1. American Standard, Inc: www.americanstandard-us.com.
 - 2. Delany Products: www.delaneyvalve.com.
 - 3. Sloan Valve Company: www.sloanvalve.com.
 - 4. Zurn Industries, Inc: www.zurn.com.
- D. Urinal Carrier:
 - 1. Manufacturers:
 - a. JOSAM Company: www.josam.com.
 - b. Wade Drains: www.wadedrains.com.
 - c. Watts Drainage: www.watts.com
 - d. Zurn Industries, Inc: www.zurn.com.
 - e. Jay R. Smith: www.jrsmith.com
 - 2. Description: Cast iron and steel frame with welded feet, adjustable face plate and upper support plate, vent, internal test cap, fixture bolts, trim and bonded gasket.
- E. Refer to architects elevation for mounting height.

2.04 LAVATORIES

- A. Lavatory Manufacturers:
 - 1. American Standard, Inc: www.americanstandard-us.com.
 - 2. Elkay: www.elkay.com.
 - 3. Kohler Company: www.kohler.com.
 - 4. Zurn Industries, Inc: www.zurn.com.
 - 5. Sloan

B. Supply Faucet Manufacturers:

1. American Standard Inc: www.americanstandard.com.
2. Chicago: www.chicagofaucets.com.
3. Delta Faucets: www.specselectonline.com.
4. Kohler Company: www.kohlerco.com.
5. T&S Brass
6. Zurn
7. Vitra: www.vitra-usa.com.
8. Symmons

C. Lavatory (L-1):

1. Model: American Standard 0355.012.
2. Description: ADA compliant, vitreous china, front overflow, and faucet holes on 4 inch centers.
3. Mounting height: 34 inches from finished floor to rim, wall hung. Refer to architects elevations for additional mounting height information.
4. Lavatory faucet: One Handle
 - a. Model: Delta 501-HGMHDF
 - b. Description: 4 inch centerset lavatory faucet with solid brass body. 4 1/2" long spout, 0.5 GPM vandal resistant aerator & single lever handle.
 - c. Provide with Lawler 570, Powers LFLM495, Watts LFMMV, or equivalent thermostatic mixing valve with spindle to adjust temperature and internal check valves. Rated for 0.5 GPM use.

D. Accessories:

1. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon. Provide with Truebro lav guards for waste and supplies or equal.
2. Waste with perforated open strainer.
3. Provide lavatories with thermostatic mixing valve.
 - a. Manufacturer and Model:
 - 1) Lawler 570.
 - 2) Powers LFLM495.
 - 3) Watts LFMMV.
 - 4) Equivalent thermostatic mixing valve with ASSE 1070 rating.
4. Stop Valves
 - a. Brasscraft model KT series stop valves shall be used for all stops.
5. Lavatory Carrier:
 - a. Manufacturers:
 - 1) JOSAM Company: www.josam.com.
 - 2) Wade Drains: www.wadedrains.com.
 - 3) Watts Drainage: www.watts.com
 - 4) Zurn Industries, Inc: www.zurn.com.
 - 5) Jay R. Smith: www.jrsmith.com
 - b. Description: Cast iron and steel frame with welded feet, adjustable headers, concealed arm supports, bearing plate and stud, alignment truss and mounting fasteners.

2.05 SINKS

- A. Sink Manufacturers:
 - 1. American Standard, Inc: www.americanstandard-us.com.
 - 2. Elkay: www.elkay.com.
 - 3. Just: www.justmfg.com.
 - 4. Kohler Company: www.kohler.com.
 - 5. Franke
 - 6. Kindred
- B. Supply Faucet Manufacturers:
 - 1. American Standard Inc: www.americanstandard.com.
 - 2. Chicago: www.chicagofaucets.com.
 - 3. Delta Faucets: www.deltafaucet.com.
 - 4. Kohler Company: www.kohlerco.com.
 - 5. T & S Brass
 - 6. Symmons
- C. Sink (S-1):
 - 1. Model: Just DL-2128-A-GR.
 - 2. Description: Type 304, 18 gauge stainless steel, dual compartment sink with 3 faucet holes on 4 inch centers.
 - a. Provide with center drain location when installed in non-ADA location.
 - b. Provide with rear drain location when installed in a ADA location
 - c. Refer to architects plans for ADA requirements.
 - 3. Mounting: In-counter.
 - 4. Faucet: 2 Handle
 - a. Model: Chicago 786-GN8AE3CP.
 - b. Description: ADA compliant, brass construction, 8" long swiveling gooseneck faucet with 2.2 GPM aerator chrome finish. Provide with 4" wrist blade handles.
 - 5. Accessories:
 - a. Chrome plated 17 gage (1.3 mm) brass P-trap with clean-out plug and arm with escutcheon. Provide with Truebro sink guards or equal.
 - b. Basket strainer
 - c. Brasscraft model KT series stop valves.

2.06 ELECTRIC WATER COOLERS

- A. Electric Water Cooler Manufacturers:
 - 1. Elkay Manufacturing Company: www.elkay.com.
 - 2. Haws Corporation: www.hawscor.com.
- B. Electric Water Cooler with Bottle Filler (EWC-1)
 - 1. Model: Elkay EZSTL8WS
 - 2. Description: Self contained, wall hung electric refrigerated water cooler, ADA compliant, self closing Easy-Touch controls on front and sides, double unit with cane apron. Provide a bottle filler above the low unit with electronic sensor for touchless activation. Provide water and electrical connections to the bottle filler.
- C. Refer to architects elevations for mounting heights of unit.

PART 3 EXECUTION

3.01 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.

3.02 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with 1/4 turn ball valve stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall supports and bolts. Caulk around perimeter of fixtures.
- E. Seal under the rim of self-rimming counter top mounted sinks and lavatories with either caulk or putty.
- F. Solidly attach water closets to floor with lag screws.
- G. Refer to architects plans and elevations for mounting heights, locations, and accessibility for all bathtub/shower and shower heads, controls, and accessories. All component locations must meet architectural, plumbing, and ADA code requirements. Any discrepancies or questions shall be brought to the attention of the architect and engineer prior to installation of fixture.
- H. Refer to architects plans and elevations for mounting locations and heights of all fixtures and accessories. Any discrepancies or questions shall be brought to the attention of the architect and engineer prior to installation of fixture.

3.04 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.05 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 CLEANING

- A. Clean plumbing fixtures and equipment.

3.07 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.
- B. Repair or replace damaged products before Date of Substantial Completion.
- C. Do not permit use of fixtures during construction.

END OF SECTION

**SECTION 23 0100
HVAC GENERAL REQUIREMENTS**

PART 1 - GENERAL

1.01 APPLICABILITY

- A. The work covered by the Division of the Specifications consists of providing all labor, supervision, equipment, materials, all incidentals, related items and appurtenances, and performing all operations necessary to complete the installation of work in strict accordance with these specifications and drawings.
- B. All work shall be finished, tested, and ready for operation. The word "Provide" shall mean "furnish and install complete and ready for use".

1.02 DRAWINGS:

- A. The drawings indicate the extent and general layout of the mechanical systems intended for the building. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, connections, and accessories which may be required. Provide offsets, fittings, valves, and accessories as may be required, to produce a complete and operating installation of type shown and specified.
- B. Mechanical drawings are diagrammatic in nature and should not be scaled to obtain dimensions. Obtain dimensions and locations of partitions, walls, etc., from the Architectural dimensioned drawings. Consult the Architectural drawings for details of construction, location of suspended ceilings, ceiling heights, and other pertinent information. Architect's drawings shall not take precedence over field measurements.
- C. All drawings and specifications shall be considered in bidding. The drawings and specifications are complimentary, and what is called for in either of these shall be as binding as though called for by both. Should any conflict arise between drawings and specifications, such conflict shall be brought to the attention of the Architect.

1.03 SUBMITTALS

- A. All submittals to be reviewed, approved, and stamped by submitting contractor prior to submittal to engineer. Submittals not reviewed by submitting contractor prior to submittal to engineer will be returned marked "Not Reviewed".

1.04 APPROVED MANUFACTURERS

- A. Requests for substitution of materials and/or equipment other than those named in the specifications may be made to the Engineer. The request shall be made in duplicate and shall include a request for approval or substitution, pre-addressed, postage pre-paid envelope and information relating to the suitability of the product. No requests by fax. Requests shall be in the Engineer's office not later than ten (10) days prior to Bid Date. Addenda will publish the approved requests.
- B. Where approved manufacturers are indicated in the specifications, the approval does not relieve the responsibility of the contractor to provide products and systems which meet the requirements of the specifications and drawings.
- C. Performance, dimensions, electrical requirements, and functions shall be coordinated with the basis of design indicated on the drawings and in the specifications. If there are differences from the basis of design they should be brought to the attention of the Engineer.
- D. Revisions required by the differences from basis of design, shall be provided to the Owner without additional cost. Revisions to the work of other contractors on the project, due to differences in equipment, shall be provided by the contractor supplying the equipment at no additional cost to the Owner.

1.05 INSTRUCTION OF OWNER'S EMPLOYEES:

- A. Provide, without additional expense to the Owner, the services of competent instructors, who will give full instructions in the care, adjustment, and operation of all parts of the mechanical equipment to the Owner's employees who are to have charge of the equipment.
- B. An operating and maintenance manual shall be made available to the Owner's operating personnel during the instruction and left with the Owner upon completion of the instruction.
- C. The instruction provided for each system shall be as specified in other sections of this specification. Have the Owner's employees sign a statement that they were present for the training session. Submit a copy of the sign-in sheet with close-out documents.

1.06 INSTALLATION OF EQUIPMENT:

- A. All appliances and equipment shall be installed and connected in accordance with manufacturer's instructions and recommendations unless such instructions are in conflict with these specifications.
- B. All equipment shall be installed in such a manner and location as to facilitate accessibility for maintenance and/or replacement.
- C. As a part of the work of this contract, the Mechanical Contractor shall make any changes in the pulleys, belts, and dampers, and shall install additional dampers required for correct balance as recommended by air balance agency, at no additional cost to the Owner.
- D. The use of permanent HVAC system for temporary heating, cooling, ventilating and air conditioning is prohibited.

1.07 COOPERATION WITH OTHER TRADES:

- A. Cooperate with other trades so as to avoid interferences. Where required to avoid interferences with other work or to increase the headroom, the Contractor shall off-set the piping and/or re-route the duct work where directed by the Engineer. Carefully check all construction details to assure the proper installation of all work under this specification. Schedule the work such that it will keep pace with the work of other crafts and cause no delay.

1.08 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 all of the existing conditions and limitations. No extras will be allowed because of Contractor's misunderstanding as to the amount of work involved or lack of his knowledge of any condition in connection with the new construction.

1.09 CODES, ORDINANCES, REGULATIONS, & STANDARDS:

- A. The entire installation shall be made in accordance with all state and local laws. If, in any instance, the plans and specifications conflict with such laws, the law shall take precedence. This, however, shall not be construed as relieving 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.
- B. All work shall conform to applicable state and local codes, ordinances, regulations, and/or standards.

1.10 PERMITS, LICENSES AND FEES

- A. The contractor shall secure and pay for all the associated 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.

1.11 CONTRACTOR WARRANTIES

- A. Contractor shall guarantee all equipment, materials, and workmanship for a period of one year from the date of final completion. Any defects in equipment, materials or workmanship that appear or cause any issues within the one year period shall be repaired at no additional cost, (this shall include materials and labor). Refer to all other specification sections for additional guarantees/warranties requirements.

1.12 TRENCHING, BACKFILL AND COMPACTION

- A. As a minimum requirement, the fill shall be either subsoil excavated on-site or engineered fill. The fill shall be free of lumps larger than 3 inches, rocks larger than 2 inches, frozen or spongy and wet material not capable of compaction in place.

PART 2 - PRODUCTS

2.01 OPERATION & MAINTENANCE MANUALS

- A. Refer to front end specifications for O&M requirements.
- B. Manual shall include an index in the front of each manual for the sections included in the manual. Each section shall be referenced with plastic tabs.
- C. Include in the front of each manual a complete listing of all mechanical contractors and sub-contractors used on the project. Include names, addresses and phone numbers for each contracted listed.
- D. Manuals shall be arranged by specification number. Each piece of equipment shall be referenced by tag number with tabs. At the beginning of each section, the equipment supplier's name, address and phone number shall be provided.
- E. Data for equipment included in the manuals:
 - 1. Approved shop drawings clearly showing the models, sizes and capacities of equipment used. All shop drawings included in the manual shall have all review comments addressed.
 - 2. Operations Manuals detailing step by step procedures for putting equipment into operation.
 - 3. Maintenance Manuals from the manufacturer of each piece of equipment including instructions for installation, maintenance and lubrication. Manuals shall include parts lists for all replacement parts.
 - 4. All equipment warranty information with warranty registration completed in owners name.
- F. Include the following reports in the manuals:
 - 1. Testing and balancing reports for air and water systems as specified.
 - 2. Start-up reports.
 - 3. Valve and damper tag lists.

2.02 MECHANICAL ANCHORS TO CONCRETE

- A. Anchors shall have current ICC-ES report that demonstrates compliance with ACI 355.2 supplemented by ICC-ES AC 193.

2.03 SUPPORTING STEEL, ROOF AND WALL OPENINGS:

- A. Provide structural steel framework for supporting mechanical equipment as required.
- B. Unless otherwise indicated by the drawings, lintels for new mechanical openings shall be provided by the contractor installing the pipe or duct.
- C. Unless otherwise indicated by the drawings, angles to frame a new roof opening through the roof deck shall be provided by the contractor installing the pipe or duct through the roof.

- D. All steel work shall be in conformance with the requirement of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. Material shall conform to ASTM A36.

2.04 SLEAVES, CUTTING, AND CORE DRILLING:

- A. Provide sleeves for piping and ductwork openings in masonry walls.
- B. The contractor shall saw cut or core drill existing masonry floors and walls for new ductwork and/or piping penetrations. The contractor shall cut new openings through framed walls for ductwork and/or piping penetrations. Provide headers as needed in frame walls.

2.05 FIRESTOPPING

- A. Provide firestopping assemblies for the required fire ratings and listed in the current year certification books of UL, FM or ITS (Warnock Hersey).
- B. See the Architectural drawings for required ratings. Refer to the Mechanical drawings for additional ratings. Provide firestopping for all penetrations of these assemblies.

2.06 SEALING PENETRATIONS IN NON-RATED WALLS AND FLOORS

- A. Provide caulk at penetrations of non-rated walls and floors for ductwork and piping. If the gap is too large for caulk, provide fiberglass insulation for backing. Conceal the fiberglass with either caulk or sheetmetal. Refer to specifications for sleeve requirements.
- B. In mechanical rooms and other water-proof floor areas, provide sleeves or concrete pads at least 2" higher than the top of slab to prevent water from running through the annular space between the duct or pipe and the floor opening. In addition to the sleeve, provide packing and caulking around the duct or pipe inside the sleeve to prevent noise transmission through openings in the floor.

2.07 ACCESS DOORS IN CEILINGS AND WALLS

- A. Provide metal lockable access doors in gypsum board ceilings and walls where needed for access to dampers or valves. Coordinate the installation of the access doors with the ceiling contractor. Confirm the location of the panels with the Architect. Provide rated doors where required, refer to architects plans for rated walls/ceilings.

PART 3 - EXECUTION

3.01 FIRESTOPPING INSTALLATION

- A. Verify openings are ready to receive the firestopping. Modify the openings as required to accommodate the requirements for the certified assembly drawing for the firestopping material.
- B. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- C. Remove incompatible materials that could adversely affect bond.

3.02 TRENCHING, BACKFILL AND COMPACTION

- A. Compact to minimum of 95 percent of maximum dry density. Cut out soft areas and backfill. Do not fill with frozen materials. Place and compact in layers not exceeding 8 inches compacted depth. Correct areas that are over-excavated. Maintain moisture content of fill materials to obtain compaction density.

END OF SECTION

**SECTION 23 0110
HVAC DEMOLITION**

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. Contract documents and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections apply to this section.
- B. This section specifies the demolition and removal of all HVAC, equipment and distribution conduits including but not limited to ductwork, air outlets, piping, controls, insulation and accessories in existing building.
- C. Unless otherwise noted in the Documents, all salvage items removed in connection with this Contract are to become the property of the Contractor, however the Owner shall have the first right of refusal on all equipment removed.

1.02 SUBMITTALS:

- A. Proposed Dust Control and Noise Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- B. Schedule of selective demolition activities:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of building utility services.
 - 3. Coordination for shutoff, capping and continuation of services.
 - 4. Coordination of Owner's continued occupancy of portions of existing building and of Owner's occupancy of completed work.
- C. Pre-demolition photographs or videotape showing existing pre-demolition conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before demolition work begins.

1.03 PROJECT CONDITIONS:

- A. Owner will occupy portions of the building immediately adjacent to selective demolition area. Conduct demolition so Owner's operation will not be disturbed. Provide not less than 48 hours notice to Owner of activities that will affect the Owner's operations.
- B. Maintain existing services to Owner occupied areas during demolition if possible or coordinate interruption of services prior to demolition.
- C. Owner assumes no responsibility for condition of area to be selectively demolished.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
- E. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Verify field measurements and existing ductwork arrangements are as shown on Drawings.

- B. Verify that abandoned equipment serves only abandoned facilities.
- C. Demolition drawings are based on causal field observation and existing record documents. The demolition Drawings are diagrammatic and show the general scope of demolition work and do not show all the construction detail of the original record drawings. Report discrepancies to the Project Engineer before disturbing existing installation.
- D. The Contractor shall visit the existing building and ground and review the existing building record drawings for details of existing installation to familiarize himself with existing conditions prior to submitting bid. No allowance will be made subsequently, in this connection, on behalf of the contractor for any error or negligence on his part.
- E. Beginning of demolition means the Contractor accepts existing conditions.

3.02 PREPARATION:

- A. Disconnect HVAC systems in areas scheduled for removal. Notify Project Engineer and Owner of areas to be affected by hvac demolition work prior to commencing.
- B. Disconnect automatic temperature controls in areas scheduled for removal. Notify Project Engineer and Owner of area to be affected by control demolition work prior to commencing.

3.03 SELECTIVE DEMOLITION AND EXTENSION OF EXISTING HVAC WORK:

- A. Demolish and remove from site, and extend existing hvac work under provisions of this Division and as indicated on the Drawings unless otherwise noted.
- B. Salvage items noted to remain the property of the Owner shall be delivered to a location to be designated by the Owner. Contractor shall remove from construction areas all trash or debris as it accumulates and dispose of it off site at no additional cost to the Owner. All construction areas shall be kept clean, safe, and orderly at all times. At the completion and acceptance for work, Contractor shall remove from the site all debris and surplus materials resulting from this work and dispose of them off site at no additional cost to the Owner.
- C. Do not use cutting torches until work area is clear of flammable materials. At concealed spaces verify condition and contents of hidden space before starting flame cutting operations. Maintain Fire Watch and portable fire-suppression devices during flame-cutting operations. Maintain and evaluate ventilation during flame-cutting operations.
- D. Maintain ventilation for dust control during selective demolition process. Verify Owner requirements for dust control and conform to their standards for all demolition activities.
- E. Remove, relocate, and extend existing installations to accommodate new construction as required for proper installation and system operation.
- F. Remove all accessories above grade. When removing hvac equipment or terminal devices all associated pipe, duct, ATC devices, wiring, etc. shall be removed and capped as required. Cut piping, duct, tubing, etc. behind walls, above ceilings and below floors, and patch surfaces to match existing conditions. Finishes will be by others unless otherwise noted in documents.
- G. Neatly cut openings and holes plumb, square and true to dimension required. Use cutting methods least likely to damage construction to remain or adjoining construction. Cut and drill from exposed surfaces into concealed surfaces to avoid marring or spalling of finished surfaces. Temporarily cover openings to remain.
- H. Patch all openings created by removal of hvac equipment, ATC devices, duct, pipes, etc. unless noted as being patched by others. Openings to be patched to match existing with similar material and finish unless otherwise noted.
- I. Seal all existing roof penetrations, which will not be reused. Roof patching shall be the responsibility of the mechanical contractor.
- J. Remove, relocate or provide brackets, hangers, and other accessories as required.
- K. Repair adjacent construction and finished damaged during demolition and extension work.

- L. Maintain access to existing mechanical installations, which remain active.

3.04 CLEANING AND REPAIR:

- A. Clean and repair existing materials and equipment, which remain or are to be returned to the Owner.
- B. All building surfaces damaged and openings left by new Work or the removal or relocation of hvac equipment, piping, etc., shall be repaired to original condition and painted by the Contractor.

END OF SECTION

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SECTION 23 0593
TESTING, ADJUSTING, AND BALANCING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic, plumbing recirculating hot water, and plumbing recirculating hot water systems.

1.02 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. AABC MN-1 - AABC National Standards for Total System Balance; 2002.
- C. NEBB (TAB) - Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems; 2019, with Errata (2022).
- D. SMACNA - HVAC Air Duct Leakage Test Manual, current edition.

1.03 SUBMITTALS

- A. Duct Leakage Testing Reporting: Provide written report when test is successful for each section of tested.
- B. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. 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.
 - 2. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 3. Form of Test Reports: Reports in accordance with one of the referenced standards.
 - 4. Units of Measure: Report data in I-P (inch-pound) units only.

PART 2 EXECUTION

2.01 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. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
 - 3. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute.
 - 4. 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. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: upon completion submit AABC National Performance Guaranty.
 - b. NEBB, National Environmental Balancing Bureau.
 - c. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute.
- D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

2.02 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.
 - 16. Suitable access to balancing valves and equipment is provided.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

2.03 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 10 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.
- D. Plumbing Recirculating Hot Water Systems: Adjust to within plus or minus 10 percent of design.

2.04 RECORDING AND ADJUSTING

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

2.05 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.

- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct. A pitot tube traverse shall be required at each supply, return, exhaust, outside air, and relief air fan unless otherwise noted.
- 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. 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.
- H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- I. 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.
- J. Test air handling system in economizer mode. Verify proper operation and adjust, if necessary.

2.06 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 gages 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. Effect system balance with automatic control valves fully open to heat transfer elements.
- D. 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.
- E. 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.

2.07 SCOPE

- A. Test, adjust, and balance all mechanical and plumbing equipment indicated on the drawings and specifications. Submit reports on NEBB or AABC forms.

END OF SECTION

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**SECTION 23 0713
DUCT INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Duct insulation.
- B. Duct liner.

1.02 REFERENCE STANDARDS

- A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- C. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2019.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.03 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.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum ten years of experience and approved by manufacturer.

1.04 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.

1.05 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

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.02 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
 - 1. Johns Manville: www.jm.com.
 - 2. Knauf Insulation; Atmosphere Duct Wrap: www.knaufinsulation.com/#sle.
 - 3. Owens Corning Corporation: www.ocbuildingspec.com.

- B. 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.
- C. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter.

2.03 DUCT LINER

- A. Manufacturers:
 - 1. Armaflex AP Duct Liner
 - 2. Or approved equal
- B. Insulation: Flexible closed cell insulation complying with ASTM C 1534.
 - 1. Apparent Thermal Conductivity: Maximum of .250 at 75 degrees F.
 - 2. Service Temperature: Up to 180 degrees F.
- C. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Duct Application:
 - 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. Duct and Plenum Liner Application:
 - 1. Adhere insulation with adhesive for 100 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 clear inside dimensions. Upsize duct as needed for thickness of liner.
 - 6. Ductwork indicated as lined on the drawings shall also be provided with external insulation as scheduled unless specifically excluded.

3.03 SCHEDULES

- A. R-values listed in the schedule are minimum values. The requirement is for installed R-value assuming 25% compression of the insulation. PCF is an abbreviation for pounds per cubic foot.
- B. Exhaust Ducts Within 10 ft of Exterior Openings:
 - 1. Flexible Glass Fiber: 2 inches thick, 1.50 pcf
- C. Outside Air Intake, Relief Ducts & Outside/Return Mixed Air Ducts:
 - 1. Flexible Glass Fiber: 2 inches thick, 1.50 pcf
- D. Supply Ducts in concealed spaces:

- 1. Flexible Glass Fiber: 2 inches thick, 0.75 pcf (R-5)
- E. Ducts in Mechanical Rooms:
 - 1. Supply Ducts
 - a. Flexible Glass Fiber: 2 inches thick, 1.50 pcf (R-5)
 - 2. Outside Air, Mixed Air, Combustion Air and Relief Air Ducts
 - a. Flexible Glass Fiber: 2 inches thick, 1.50 pcf (R-5)
- F. ALL Ductwork located in Attic Space:
 - 1. Flexible Glass Fiber: R-12 total
- G. Transfer air ducts: 1/2 inch thick Duct Liner
- H. Insulated Flexible Ducts: R-5

END OF SECTION

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**SECTION 23 0923
DIRECT-DIGITAL CONTROL SYSTEM**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. System description.
- B. Operator interface.
- C. Power supplies and line filtering.
- D. System software.
- E. Controller software.

1.02 SUBMITTALS

- A. Product Data: Provide data for each system component and software module.
- B. Shop Drawings:
 - 1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
 - 2. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration digital media containing graphics.
 - 3. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
 - 4. Indicate description and sequence of operation of operating, user, and application software.
- C. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.
- D. Designer's Qualification Statement.
- E. Installer's Qualification Statement.
- F. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
- G. 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.
- H. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with NFPA 70.
- B. Designer Qualifications: Perform design of system using manufacturer's software under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with minimum five years of documented experience and approved by manufacturer.

- E. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for purpose specified and indicated.

1.04 WARRANTY

- A. Provide five year manufacturer's warranty for field programmable micro-processor based units.

1.05 PROTECTION OF SOFTWARE RIGHTS

- A. Prior to delivery of software, the Owner and the party providing the software will enter into a software license agreement with provisions for the following:
 - 1. Limiting use of software to equipment provided under these specifications.
 - 2. Limiting copying.
 - 3. Preserving confidentiality.
 - 4. Prohibiting transfer to a third party.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Schneider Electric/Andover as installed by Energy Tech Systems

2.02 SEQUENCE OF OPERATIONS

- A. Remove controls and graphics for all equipment that is being removed or is obsolete and remaining on roof (exhaust fans).
- B. Provide controls for equipment listed below and connect to the existing Building Automation System. Provide graphics on front end for all new equipment.
 - 1. Exhaust Fan (EF-1,2): Monitor new exhaust fan status and alarm. Provide with animation on the front end graphics. Fans will be interlocked with lighting occupancy sensors and will run when space is occupied.
 - 2. Recirculating Pump (RCP-1,2): Provide time schedule to operate pump during occupied times. Monitor and alarm. Provide with animation on front end graphics.
 - 3. Furnace and Condensing Units: Provide time schedule to operate pump during occupied times. Monitor and alarm. Provide with animation on front end graphics. Furnace and Condensing units shall modulate to maintain 70 degrees (adjustable). Fan shall be on during occupied mode. Cycle fan during unoccupied mode. Outside air damper shall be open when unit is occupied mode (provide override switch on front end graphics). Provide with night temperature setback. Provide manual override switch in mechanical rooms for furnace.

2.03 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. 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.
- E. DDC contractor to coordinate all building controls power requirements with electrical contractor. All costs associated with building controls power requirements to be by DDC contractor.
- F. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

2.04 OPERATOR INTERFACE

- A. Hardware:
 - 1. Connect to the existing Building Automation System in building.

2.05 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. 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:
 - 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.

2.06 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.

2.07 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. 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.

2.08 SYSTEM SOFTWARE

- A. Operating System:
1. Concurrent, multi-tasking capability.
 - a. Common Software Applications Supported: Microsoft Excel.
 2. 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.
 3. 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.
 4. Standard HVAC Graphics Library:
 - a. All HVAC Equipment
 - b. All Ancillary Equipment
- B. Workstation System Applications:

1. Automatic System Database Save and Restore Functions:
 - a. Current database copy of each Building Controller is automatically stored on hard disk.
 - b. Automatic update occurs upon change in any system panel.
 - c. In the event of database loss in any system panel, the first workstation to detect the loss automatically restores the database for that panel unless disabled by the operator.
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) Workstations.
 - 2) Printers.
 - 3) Modems.
 - 4) Network connections.
 - 5) Building management panels.
 - 6) 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 Workstation 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. Electrical, Fuel, and Weather:
 - 1) Electrical Meter(s):
 - (a) Monthly showing daily electrical consumption and peak electrical demand with time and date stamp for each meter.
 - (b) Annual summary showing monthly electrical consumption and peak demand with time and date stamp for each meter.
 - 2) Fuel Meter(s):
 - (a) Monthly showing daily natural gas consumption for each meter.
 - (b) Annual summary showing monthly consumption for each meter.
 - 3) Weather:
 - (a) Monthly showing minimum, maximum, average outdoor air temperature and heating/cooling degree-days for the month.
- C. Workstation Applications Editors:
- 1. Provide editing software for each system application at PC workstation.
 - 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.

2.09 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.
- 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:
- 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

3.01 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 Division 26. Electrical material and installation shall be in accordance with appropriate requirements of Division 26. Minimum conduit size is 3/4 inches.
- D. Check and verify location of thermostats with plans and room details before installation. Locate 48 inches above floor.
- E. All control wiring routed in exposed areas to be in conduit. Refer to electrical specifications for additional requirements. Contractor's option to route control wiring above ceilings and in concealed space using J-hooks.

3.02 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.
- B. Provide basic operator training for 4 persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs. Include a minimum of 2 hours dedicated instructor time. Provide training on site.

3.03 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate complete and operating system to Owner.

END OF SECTION

SECTION 23 3100
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal ductwork.
- B. Nonmetal ductwork.

1.02 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- C. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.
- D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- E. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2018.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).
- G. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.
- H. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.

1.03 SUBMITTALS

- A. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK).
- B. Duct Construction Report: Provide submittal detailing duct construction requirements. Provide duct fittings, duct gages, internal/external reinforcements, drives, etc. to meet SMACNA (DCS) construction criteria for each pressure class listed in this section. Provide with applicable SMACNA tables.
- C. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of documented experience.

1.05 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.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- B. Aluminum for Ducts: ASTM B 209 (ASTM B 209M); aluminum sheet, alloy 3003-H14.
Aluminum Connectors and Bar Stock: Alloy 6061-T651 or of equivalent strength.
- C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

- D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
 - 1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
 - 2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
 - 3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
 - 4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
- E. Insulated Flexible Ducts:
 - 1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.
 - a. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
 - b. Maximum Velocity: 4000 fpm.
 - c. Temperature Range: -20 degrees F to 210 degrees F.
 - d. Insulation: Refer to HVAC Insulation Spec Section for insulation requirements.
- F. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - 1. 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.
 - 2. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E 84.

2.02 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- C. Construct T's, 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 air foil turning vanes of perforated metal with glass fiber insulation.
- D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- E. 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.

2.03 MANUFACTURED DUCTWORK AND FITTINGS

- A. Manufacture in accordance with SMANCA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing and sealing for operating pressures indicated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- D. Duct sizes indicated are inside clear dimensions.
- E. Install and seal metal and flexible ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

- F. Provide turning veins in all rectangular elbows as indicated on plans and/or if either duct dimension is 12" or larger . Transfer duct elbows do not require turning veins.
- G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- H. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- I. Use double nuts and lock washers on threaded rod supports.
- J. Do not use flexible duct to change direction.
- K. 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.
- L. Connect flexible ducts to metal ducts per detail located on drawings
- M. Set plenum doors 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.
- N. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- O. At exterior wall louvers, seal duct to louver frame and install blank-out panels.
- P. If test and balance report shows the duct traverse at the fan to be 10% or higher than the sum of the outlets, the contractor shall be required to re-seal ductwork to reduce leakage to less than 10%. Contractor shall be responsible for removing and replacing ceiling tiles, removing and replacing duct insulation and all other work required to re-seal ductwork.

3.02 SCHEDULES

- A. Ductwork Pressure Class:
 - 1. Exhaust Fans
 - a. Branch ductwork and ceiling exhaust fans, 0.5 inch w.g
 - 2. Furnaces
 - a. Supply main ducts, 1 inch w.g.
 - b. Return main ducts, 1 inch w.g.
 - c. Branch ductwork, 0.5 inch w.g.
 - d. Outside air and relief air ductwork, 1 inch w.g.

END OF SECTION

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**SECTION 23 3300
AIR DUCT ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers.
- C. Automatic dampers.
- D. Duct access doors.
- E. Duct test holes.
- F. Flexible duct connectors.
- G. Volume control dampers.

1.02 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.03 SUBMITTALS

- A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.
- B. Manufacturer's Installation Instructions: Provide instructions for fire dampers, smoke dampers, combination fire and smoke dampers, smoke dampers, and smoke dampers.
- C. Project Record Drawings: Record actual locations of access doors and test holes.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Fusible Links: One of each type and size.

1.04 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. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.02 BACKDRAFT DAMPERS

- A. Manufacturers:
 - 1. Greenheck
 - 2. Nailor Industries Inc: www.nailor.com.
 - 3. Ruskin Company: www.ruskin.com.
 - 4. Pottorff: www.pottorff.com.
 - 5. Aire Technologies, Inc.
 - 6. Tamco

- 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.

2.03 OUTSIDE AIR AND RELIEF AIR CONTROL DAMPERS

- A. Approved Manufacturers:
 - 1. Greenheck
 - 2. Ruskin
 - 3. Tamco
 - 4. Nailor
- B. Dampers larger than 10"x10" or 10"Ø shall meet the following requirements:
 - 1. Basis of design: Greenheck ICD-45.
 - 2. Construction:
 - a. Rectangular dampers shall consist of: .125 (3.2mm) aluminum channel frame insulated with polystyrene on four sides and thermally broken with dual polyurethane resin gaps; aluminum airfoil blade internally insulated polyurethane foam and thermally broken. Blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow in either direction or pressure on either side of the damper. Axle will be 1/2 in. (13mm) diameter plated steel; bearings are dual bearing with acetal inner sleeve, flanged outer bearing resulting in no metal-to-metal or metal-to-plastic contact.
 - b. Blade and jamb seals to be silicone rubber and external (out of the airstream) blade-to-blade linkage.
 - 3. Ratings:
 - a. Dampers manufacturer's printed application and performance data including pressure, velocity, leakage, and temperature limitations shall be submitted for approval showing damper suitable for pressures to 8 in. wg (1993 Pa), velocities to 4000 fpm (20.3 m/s), standard air leakage less than 8 cfm/sq. ft. @ 4 in. wg and temperatures to 200 °F
 - b. Damper air performance data shall be developed in accordance with the latest edition of AMCA Standard 500-D.
- C. Round dampers sized 10"Ø or smaller shall meet the following requirements:
 - 1. Basis of design: Greenheck VCDR-53.
 - 2. Construction:
 - a. Frame and sleeve: The damper frame and sleeve shall be of one piece design, made with 20 ga. galvanized steel and a groove for added strength.
 - b. Blade: Galvanized steel with silicone blade seal.
 - c. Mounting: Vertical or horizontal
 - 3. Ratings:
 - a. Leakage: Dampers shall have a rating of 4 cfm/sq. ft @ 1 in wg.
 - b. Differential pressure: Dampers shall have a minimum differential pressure rating of 4 in. wg.
 - c. Velocity: Dampers shall have a minimum velocity rating of 3000 fpm
- D. Direct Coupled Electronic Operators:
 - 1. Spring return control damper actuators shall be direct coupled type which require no crankarm and linkage and be capable of direct mounting. The actuator must provide proportional damper control in response to a 2 to 10 VDC or a 4 to 20 mA control input from an electronic controller or positioner.
 - 2. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation.

3. Actuators shall have control direction of rotation switch accessible on its cover. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback or master-slave applications.
4. Actuators shall be UL listed and CSA certified, have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards.
5. Verify damper operator requirements, including but not limited to voltage, with controls contractor prior to purchase of dampers.

2.04 DUCT ACCESS DOORS

- A. 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. Up to 24 inches square: Provide paired camlocks.
 2. Larger than 24 inches: Provide hinge and compression latches.
- B. Access doors with sheet metal screw fasteners are not acceptable.

2.05 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.

2.06 FLEXIBLE DUCT CONNECTORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. 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 30 oz per sq yd.
 - a. Net Fabric Width: Approximately 2 inches wide.

2.07 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Single Blade Dampers:
- C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- D. 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.
- E. Quadrants:
 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
 3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to 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. If there are conflicts to this minimum access for any damper, contact the Engineer for review. Refer to the drawings and details for size of panels. Where no size is indicated on the drawings, hand access shall be minimum 8" x 8" and shoulder access shall be minimum 24" x 24".
- D. Provide turning veins in all rectangular elbows as indicated on plans and/or if either duct dimension is 12" or larger . Transfer duct elbows do not require turning veins.
- E. Provide duct test holes where indicated and required for testing and balancing purposes.
- F. Verify operation of all smoke and combination fire/smoke dampers. Provide documentation of testing.
- 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.
- I. 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 2 duct widths from duct take-off.
- J. 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

SECTION 23 3423
HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Ceiling exhaust fans

1.02 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B. AMCA 99 - Standards Handbook; 2016.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005 (Reaffirmed 2012).
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.
- E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
- F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.
- G. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2017.
- H. UL 705 - Power Ventilators; Current Edition, Including All Revisions.
- I. UL 762 - Outline of Investigation for Power Roof Ventilators for Restaurant Exhaust Appliances; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- B. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Fan Belts: One set for each individual fan.

1.04 FIELD CONDITIONS

- A. Permanent ventilators may not be used for ventilation during construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Greenheck / Accurex
- B. Loren Cook Company: www.lorencook.com.
- C. Twin City Fan & Blower: www.tcf.com/#sle.

2.02 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: AMCA 204 - Balance Quality and Vibration Levels for Fans.
- B. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.
- C. Sound Ratings: AMCA 301, tested to AMCA 300 and bearing AMCA Certified Sound Rating Seal.
- D. Fabrication: Comply with AMCA 99.
- E. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.

- F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- G. Provide phase monitors and brown out protection on all three phase units.
- H. Hood Exhaust Fans: Comply with requirements of NFPA 96.

2.03 CEILING EXHAUST FANS

- A. Performance Ratings: Refer to drawings.
- B. Centrifugal Fan Unit: Direct driven with galvanized steel housing resilient mounted motor, gravity backdraft damper in discharge, permanently lubricated motor designed for continuous operation.
- C. Disconnect Switch: Cord and plug in housing for thermal overload protected motor and wall mounted switch.
- D. Grille: Aluminum with baked white enamel finish.
- E. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide sheaves required for final air balance.
- C. Install backdraft dampers on inlet to roof and wall exhausters.

END OF SECTION

SECTION 23 3700
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Diffusers:
- B. Registers/grilles:
- C. Roof hoods.

1.02 REFERENCE STANDARDS

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.
- B. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (Reaffirmed 2011).
- C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.03 SUBMITTALS

- A. 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.

1.04 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

2.01 MANUFACTURERS - GRILLES & DIFFUSERS

- A. Price Industries: www.price-hvac.com/#sle.
- B. Titus, a brand of Air Distribution Technologies: www.titus-hvac.com/#sle.
- C. Nailor
- D. Pottorff
- E. Tuttle & Bailey

2.02 SQUARE CONE CEILING DIFFUSERS

- A. Type: Die formed with smooth surfaces and no corner joints. Three concentric cones. Adjustable pattern controllers where indicated on the schedule on the drawings.
- B. Frame: Refer to the reflected ceiling plans. Where the ceiling is gypsum board, provide plaster frame and ceiling frame. Confirm the type of tees for lay-in tile ceilings in the Architects specification. Provide frame for narrow tee ceilings if required.
- C. Fabrication: Steel with steel frame and baked enamel off-white finish, unless otherwise noted on the drawings.
- D. Accessories: Refer to schedule on the drawings for requirements of opposed blade balancing dampers, radiation dampers and fire blankets.

2.03 CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Fixed grilles of 1/2 x 1/2 x 1/2 inch louvers.
- B. Fabrication: Aluminum with factory off-white enamel finish.

- C. Frame: Channel lay-in frame for suspended grid ceilings. Where the ceiling is gypsum board, provide plaster fane and ceiling frame. Confirm the type of tees for lay-in tile ceiling in the Architects specification. Provide frame for narrow tee ceiling if required.
- D. Accessories: Refer to schedule on the drawings for requirements of opposed blade balancing dampers, radiation dampers and fire blankets.

2.04 SUPPLY REGISTERS/GRILLES

- A. Type: Streamlined and individually adjustable blades, 3/4 inch minimum depth, 3/4 inch maximum spacing with spring or other device to set blades, vertical face, double deflection.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
- C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish. Note: grilles not located in the same room may be selected in different colors.
- D. Accessories: Refer to schedule on the drawings for requirements of opposed blade balancing dampers, radiation dampers and fire blankets.

2.05 EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with spring or other device to set blades, vertical face.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting.
- C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish. Note: grilles not located in the same room may be selected in different colors.
- D. Accessories: Refer to schedule on the drawings for requirements of opposed blade balancing dampers, radiation dampers and fire blankets.

PART 3 EXECUTION

3.01 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.
- E. Paint ductwork visible behind air outlets and inlets matte black.
- F. Inside the building, where sidewall return or exhaust grilles are mounted entirely above six feet above finished floor, install them in inverted position for sight-proof.

END OF SECTION

**SECTION 23 5400
FURNACES AND CONDENSING UNITS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Forced air furnaces.
- B. Air Cooled Condensing Units

1.02 REFERENCE STANDARDS

- A. ANSI Z21.47 - American National Standard for Gas-Fired Central Furnaces; 2016.
- B. ASHRAE Std 103 - Methods of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers; 2017, with Errata (2019).
- C. NFPA 54 - National Fuel Gas Code; 2018.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- F. NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances; 2019.
- G. UL (DIR) - Online Certifications Directory; Current Edition.

1.03 SUBMITTALS

- A. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
- B. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- D. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Filters: One for each furnace.

1.04 WARRANTY

- A. Provide three year manufacturers warranty for solid state ignition modules.
- B. Provide five year manufacturers warranty for heat exchangers.

PART 2 PRODUCTS

2.01 MANUFACTURERS (FURNACE AND CONDENSING UNIT SHALL BE SAME MANUFACTURER)

- A. Armstrong Air
- B. Carrier Corporation, a brand of United Technologies Corporation Building & Industrial Systems: www.carrier.com/#sle.
- C. Lennox
- D. Trane Inc, a subsidiary of Ingersoll Rand: www.trane.com/#sle.
- E. York International Corporation / Johnson Controls: www.york.com/#sle.
- F. Rheem
- G. Ruud

- H. Coleman
- I. Goodman
- J. Bryant
- K. Daikin

2.02 REGULATORY REQUIREMENTS

- A. Comply with NFPA 70.
- B. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.

2.03 GAS FIRED FURNACES

- A. Annual Fuel Utilization Efficiency (AFUE): 0.95 ("condensing") in accordance with ASHRAE Std 103.
- B. Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter, humidifier, and accessories; wired for single power connection with control transformer.
 - 1. Safety certified by CSA in accordance with ANSI Z21.47.
 - 2. Venting System: Direct.
 - 3. Combustion: Sealed.
 - 4. Air Flow Configuration: Refer to plans for orientation.
 - 5. Heating: Natural gas fired.
- C. Performance:
 - 1. Refer to Furnace Schedule. Gas heating capacities are sea level ratings.
- D. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner. If not certified for combustible flooring, please provide additional steel base.
- E. Primary Heat Exchanger:
 - 1. Material: Hot-rolled steel.
- F. Secondary Heat Exchanger:
 - 1. Material: Aluminized steel.
- G. Gas Burner:
 - 1. Atmospheric type with adjustable combustion air supply.
 - 2. Gas valve, two stage provides 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety pilot, manual set (On-Off), pilot filtration, automatic electric valve.
 - 3. Electronic pilot ignition, with electric spark igniter.
 - 4. Combustion air damper with synchronous spring return damper motor.
 - 5. Non-corrosive combustion air blower with permanently lubricated motor.
- H. Gas Burner Safety Controls:
 - 1. Thermocouple sensor: Prevents opening of gas valve until pilot flame is proven and stops gas flow on ignition failure.
 - 2. Flame rollout switch: Installed on burner box and prevents operation.
 - 3. Vent safety shutoff sensor: Temperature sensor installed on draft hood and prevents operation, manual reset.
 - 4. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive bonnet temperature, automatic resets.
- I. Supply Fan: Centrifugal type rubber mounted with direct drive with adjustable variable pitch motor pulley.
- J. Motor:

1. 1750 rpm single-speed, permanently lubricated, hinge mounted.
- K. Motor: Variable speed ECM.
- L. Provide external filter rack with filters.
- M. Provide plenum adapters for "A" coils if required.

2.04 AIR COOLED CONDENSING UNITS

- A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
 1. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23.1 and UL 207.
- B. Compressor: AHRI 520; hermetic, 3600 rpm, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.
- C. Provide indoor air conditioning "A" coil sized to match furnace and cooling capacity. Provide plenum adapters for "A" coils if required.
- D. Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gage ports, thermometer well (in liquid line).
 1. Provide thermostatic expansion valves.
- E. Operating Controls:
 1. Control by room thermostat to maintain room temperature setting.
- F. Low Ambient Kit: Provide refrigerant pressure switch to cycle condenser fan on when condenser refrigerant pressure is above 285 psig and off when pressure drops below 140 psig for operation to 0 degrees F. Provide hard start kit.
- G. Provide with refrigerant monitor.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
- B. Verify that proper power supply is available and located correctly.
- C. Verify that proper fuel supply is available for connection.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and requirements of authorities having jurisdiction.
- B. Install in accordance with NFPA 90A.
- C. Install gas fired furnaces in accordance with NFPA 54.
- D. Install refrigeration systems in accordance with ASHRAE Std 15.
- E. Provide vent connections in accordance with NFPA 211.
- F. Install condensing unit on 4" thick concrete pad.
- G. Pipe drain from coils to nearest floor drain.
- H. Furnace and condensing unit shall be same manufacturer.

END OF SECTION

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SECTION 260500
BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Basic Electrical Requirements applicable to Division 26 and Division 1 - General Requirements.

1.02 REFERENCES

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2026

1.03 DEFINITIONS

- A. The meaning and intent of the word "provide" as used in these specifications is the same as the words "The Contractor (and/or Bidder) shall provide."
- B. The word "provide" shall carry the same meaning as "furnish and install."

1.04 PERFORMANCE REQUIREMENTS

- A. Conform to all applicable Building Codes, ordinances, laws and regulations.
- B. Electrical: Conform to NFPA 70 - National Electrical Code.
- C. Furnish products listed and classified by Underwriters Laboratories Inc.®, as suitable for the purpose specified and shown.
- D. Obtain permits, and request inspections from authority having jurisdiction.
- E. If the drawings and/or specifications conflict with any regulatory requirement, the regulatory requirement shall be followed. This does not relieve the Contractor from complying with items in the drawings and/or specifications in excess of the regulatory requirements.
- F. Test Standards:
1. All materials and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc.®, standards where test standards have been established. Equipment and materials which are not covered by UL® Standards will be accepted provided the equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory acceptable to the authority having jurisdiction.
 2. Definitions:
 - a. Listed; equipment or device of a kind mentioned which:
 - 1) Is published by a nationally recognized laboratory which makes periodic inspection of production of such equipment.
 - 2) States that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.
 - b. Labeled; equipment or device is when:
 - 1) It embodies a valid label, symbol, or other identifying mark of a nationally recognized testing laboratory such as Underwriters Laboratories Inc.®
 - 2) The laboratory makes periodic inspections of the production of such equipment.
 - 3) The labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.

- c. Certified; equipment or product is which:
 - 1) Has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards or to be safe for use in a specified manner.
 - 2) Production of equipment or product is periodically inspected by a nationally recognized testing laboratory.
 - 3) Bears a label, tag, or other record of certification.
- d. Nationally recognized testing laboratory; laboratory which is approved by the authority having jurisdiction.

1.05 PROJECT/SITE CONDITIONS

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.
- C. Owner will occupy portions of the building immediately adjacent to selective demolition area. Conduit demolition to the Owner's operation will not be disturbed. Provide not less than 48 hours notice to Owner of activities that will affect the Owner's operation.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for procedures.
- B. Product Data: Submit product data grouped to include complete submittals of related systems, products, and accessories.
- C. Shop Drawings: Submit Shop Drawings grouped to include complete submittals of related systems, products, and accessories.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- E. Mark dimensions and values in units to match those specified.

1.07 DRAWINGS

- A. The drawings indicate the general arrangement and extent of electrical work. Do not scale off the drawings. All data shall be field verified with actual field conditions. Contractor shall be responsible to field measure and confirm mounting heights and location of equipment with respect to existing structures and field conditions.
- B. The drawings and specifications are complementary each to the other. What is called for by one shall be as binding as if called for by both.
- C. Omissions or discrepancies between different drawings or between drawings and specifications or between contract documents and regulations and/or codes shall be brought to the attention of the Architect/Engineer for a decision in writing. Interpretation before the bid shall be by addendum only. If an interpretation is not given by addendum, bid the greater quantity or better quality.

1.08 PERMITS AND LICENSES

- A. Obtain and pay for required licenses and permits. Pay for fees and charges for connection to outside services. Coordinate costs for electrical service including transformers, telephone service, cable TV service during the bidding phase of the project. Pay for use of property other than the site of the work for storage of materials or other purposes.
- B. Installation shall be performed by persons licensed and skilled in the trade, and shall be done under the supervision of a master electrician licensed by the State.

1.09 PROGRESS OF WORK

- A. Organize electrical work such that the progress of the work will conform to the progress of other trades, and complete the entire installation as soon as the conditions of the building will permit. Any cost resulting from defective or ill-timed work performed under this section shall be borne by this Contractor.
- B. Portions of work will be required to be accomplished during other than normal working hours.

1.10 CORRELATION OF WORK

- A. Organize work so that it will not interfere with the work of other trades. Consult the drawings and specifications for work of other trades to correlate information, and consult the architectural and structural drawings for details and dimensions. Verify the location of all outlets. If interference develops, bring it to the attention of the Architect/Engineer for a decision. No additional compensation will be allowed for the moving of misplaced outlets, wiring or equipment.
- B. Before roughing-in for electrical equipment furnished by others, verify the voltage and current characteristics and control connections of this equipment, and provide the proper feeders and connections as recommended by the manufacturer of the equipment.

1.11 CUTTING AND PATCHING

- A. Lay out all work in advance and where removal of door frames, portions of walls, ceilings or floors are required, and cutting, channeling, chasing, or drilling of building surfaces is necessary for the proper installation of electrical equipment, carefully perform this work in a manner which does not weaken floors and walls. Damaged surfaces shall be repaired at no cost to the Owner.
- B. Concrete shall be cut only with rotary type drilling tools. Electrical equipment shall not be cut with torches, and shall be joined only by bolting (i.e., do not weld wireways to panels).
- C. Patching, when required, shall be finished to match adjoining surfaces and is subject to approval by the Architect/Engineer.

1.12 EXAMINATION OF SITE

- A. Before submitting a bid, each bidder shall examine the site, check the means of installing electrical equipment and shall be familiar with the existing conditions and limitations. No extras will be allowed because of the Contractor's misunderstanding of the amount of work involved or lack of knowledge of any site conditions which may affect the work. Any apparent variance of the drawings or specifications from the existing conditions at the site shall be called to the attention of the Architect/Engineer before submitting a bid.

1.13 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 01 78 00 for Operation and Maintenance Manual requirements.

1.14 DELIVERY, STORAGE AND HANDLING

- A. The Contractor is responsible for receiving all deliveries and proper storage and protection of all products. Storage of products on site shall be coordinated with the Owner prior to beginning work.

1.15 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01 30 00 and Section 01 7800.
- B. Include all changes and deviations from contract documents. Clearly mark in red colored pencil. Include all addendum items and approved change orders.

1.16 MINIMUM REQUIREMENTS

- A. References to the National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), National Fire Protection Association (NFPA), National Electrical Installation Standards (NEIS), and any other applicable standards are minimum installation requirement standards.
- B. Drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the above standards.

END OF SECTION

**SECTION 260501
ELECTRICAL DEMOLITION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Demolition drawings are based on casual field observation and existing record documents.
- C. Report discrepancies to Architect before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Field verify exact locations of devices and disconnect existing lightning protection systems to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Services and Panelboards: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 2 weeks before partially or completely disabling system.
 - 2. Make temporary connections to maintain service in areas adjacent to work area.
 - 3. Work may need to be done outside normal working hours to avoid disruption of power to any critical areas. Coordinate required work hours with the Owner.
- E. Ceiling & HVAC Remodel: In areas where the ceilings are being removed and replaced, all existing conduit and cabling that remains shall be resupported in accordance with these specifications. In areas where existing HVAC ductwork and piping are being removed and replaced, relocate existing conduit and boxes that are to remain to accommodate installation of new ductwork and piping. Coordinate with mechanical contractor. Provide new cable support hangers in accordance with Section 27-1005 to resupport existing cables and new conduit straps and supports in accordance with sSection 26 05 33.13.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction.

- B. Remove abandoned wiring to source of supply unless noted otherwise.
- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- E. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- F. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- G. Repair adjacent construction and finishes damaged during demolition and extension work.
- H. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- I. Install junction boxes in walls, ceilings or floors if required to continue wiring.
- J. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry.

3.05 MATERIAL DISPOSAL

- A. Material and equipment deemed salvageable by the Owner shall remain the property of Owner. Contractor shall dismantle these items to manageable size and deliver to designated storage area on site. The Owner shall have first right of refusal on all material and equipment.
- B. All other materials and equipment shall become property of Contractor and must be removed from site and disposed of by approved method.
- C. Fluorescent lamps and high intensity discharge lamps shall be packed in suitable shipping cartons and broken lamps shall be put in suitable sealed shipping containers. Store lamps in an area and in a manner that will prevent breakage. Label the lamp storage area and each lamp container as universal waste. Provide a universal waste manifest and ship to an approved disposal site. The maximum quantity of lamps that can be stored on site before shipping is 1,000 lamps. Comply with all regulations of the State Pollution Control Agency.
- D. If light fixtures are to be removed from the jobsite intact, remove the light fixture from the jobsite as a unit. Do not remove lamps or ballasts on the jobsite.
- E. For disposed light fixtures, remove the lamps and ballasts from fluorescent light fixtures and high intensity discharge light fixtures. Dispose of the lamps and ballasts as indicated above.

END OF SECTION

SECTION 260519
LOW-VOLTAGE CONDUCTORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Manufactured wiring systems.
- C. Wiring connectors.
- D. Electrical tape.
- E. Heat shrink tubing.
- F. Wire pulling lubricant.
- G. Cable ties.

1.02 RELATED REQUIREMENTS

- A. Section 26-0526 - Grounding and Bonding.
- B. Section 260553 - Electrical Identification: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- G. NEMA WC 70 - Nonshielded Power Cable 2000 V or Less for the Distribution of Electrical Energy; 2009.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- J. UL 183 - Manufactured Wiring Systems; Current Edition, Including All Revisions.
- K. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- L. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- M. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- N. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 - 3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.
- B. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS**2.01 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.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Underground feeder and branch-circuit cable is not permitted.
- E. Service entrance cable is not permitted.
- F. Armored cable is not permitted.
- G. Metal-clad cable is not permitted.
 - 1. Metal clad (MC) cable may be used only for light fixture connections from the junction box to the light fixture above accessible ceilings.
- H. Manufactured wiring systems are permitted only as follows:

2.02 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.

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- 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. Conductors for Grounding and Bonding: Also comply with Section 260526.
 - 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.
 - 2. Control Circuits: 14 AWG.
 - I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - J. 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.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 - 3. Color Code:
 - a. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - b. Equipment Ground, All Systems: Green.
 - c. Travelers for 3-Way and 4-Way Switching: Pink.
 - d. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.
 - e. For control circuits, comply with manufacturer's recommended color code.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:

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- a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. Southwire Company: www.southwire.com/#sle.
 - d. Or Equal.
- 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.
 - 2. Control Circuits: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
- 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

2.04 MANUFACTURED WIRING SYSTEMS

- A. Description: Manufactured wiring assemblies complying with NFPA 70 Article 604, and listed and labeled as complying with UL 183.
- B. Provide components necessary to transition between manufactured wiring system and other wiring methods.
- C. Branch Circuit Cables:
- 1. Conductor Stranding (Size 10 AWG and Smaller): Solid.
 - 2. Insulation Voltage Rating: 600 V.
 - 3. Insulation: Type THHN.
 - 4. Grounding: Full-size integral equipment grounding conductor.
 - 5. Armor: Steel, interlocked tape.
- D. Connectors: Keyed and color-coded to prevent interconnection of different voltages.
- E. Fixture Leads: Type TFN insulation.

2.05 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:
- 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.

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3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
 5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
 6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
 7. Conductors for Control Circuits: Use crimped terminals for all connections.
- D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- E. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- F. 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.
- G. Mechanical Connectors: Provide bolted type or set-screw type.
1. Manufacturers:
 - a. Burndy: www.burndy.com.
 - b. IlSCO: www.ilsco.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
- H. Compression Connectors: Provide circumferential type or hex type crimp configuration.
1. Manufacturers:
 - a. Burndy: www.burndy.com.
 - b. IlSCO: www.ilsco.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
- I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
1. Manufacturers:
 - a. Burndy: www.burndy.com.
 - b. IlSCO: www.ilsco.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.

2.06 WIRING ACCESSORIES

- A. Electrical Tape:
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Plymouth Rubber Europa: www.plymouthrubber.com/#sle.

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2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
 3. 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.
 4. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
- C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. American Polywater Corporation: www.polywater.com/#sle.
 - c. Ideal Industries, Inc: www.idealindustries.com/#sle.
- D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 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.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 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.

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7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
 - b. Increase size of conductors as required to account for ampacity derating.
 - c. Size raceways, boxes, etc. to accommodate conductors.
 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. 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.
 - E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
 - F. 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.
 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
 2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
 - G. Install conductors with a minimum of 12 inches of slack at each outlet.
 - H. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
 - I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
 - J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
 - K. 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.

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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.
- L. 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.
1. Dry Locations: Use insulating covers specifically designed for the connectors or heat shrink tubing.
 2. Damp Locations: Use insulating covers specifically designed for the connectors or heat shrink tubing.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 3. Wet Locations: Use heat shrink tubing.
- M. Insulate ends of spare conductors using vinyl insulating electrical tape.
- N. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- O. Color Code Legend: Provide identification label identifying color code for ungrounded conductors 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.
- P. 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.

3.04 FIELD QUALITY CONTROL

- A. Correct deficiencies and replace damaged or defective conductors and cables.
- B. Inspect wire for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor.

END OF SECTION

**SECTION 260526
GROUNDING AND BONDING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Grounding and bonding components for electrical systems.
- F. Grounding and bonding components for communications systems.

1.02 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- B. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2009.
- C. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instruction.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- C. Comply with UL 467.
- D. Comply with NECA's "Standard of Installation."

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.

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- C. 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.
 - D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - E. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 - 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
 - 7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
 - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
 - b. Metal gas piping.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
 - 2. Provide products listed and labeled as complying with UL 467 and IEEE 837 where applicable.
- B. Conductors for Grounding and Bonding:
 - 1. Use insulated copper conductors unless otherwise indicated.
- 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 and IEEE 837.
 - 2. Unless otherwise indicated, use exothermic welded connections or irreversible compression connectors for underground, concealed and other inaccessible connections.
 - 3. Unless otherwise indicated, use mechanical connectors, exothermic welded connections, or irreversible compression connectors for accessible connections.

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4. Manufacturers - Mechanical and Compression Connectors:
 - a. Burndy: www.burndy.com.
 - b. Harger Lightning & Grounding: www.harger.com.
 - c. Thomas & Betts, a member of the ABB Group: www.tnb.com.
 5. Manufacturers - Exothermic Welded Connections:
 - a. Burndy: www.burndy.com.
 - b. Cadweld, a brand of Erico International Corporation: www.erico.com.
 - c. ThermOweld, a brand of Continental Industries, Inc: www.thermoweld.com.
- D. Ground Bars:
1. Description: Copper rectangular ground bars with mounting brackets and insulators.
 2. Telecommunications Grounding Components:
 - a. Telecommunications Main Ground Busbar (TGMB): Chatsworth 40153 Series or equal by Panduit. Solid copper construction, .25 inches thick, 4 inches wide, 20 inches in length. Standard NEMA two hole lug pattern with stainless steel mounting brackets with insulated standoffs.
 - b. Telecommunications Ground Busbar (TGB): Chatsworth 13622 Series or equal by Panduit. Solid copper construction, .25 inches thick, 4 inches wide, 12 inches in length. Standard NEMA two hole lug pattern with stainless steel mounting brackets with insulated standoffs.
 - c. TGMB/TGB Connectors: two hole compression type connectors, copper alloy bolts and nuts.
 3. Size: As indicated.
 4. Holes for Connections: As indicated or as required for connections to be made.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that conditions are satisfactory for installation prior to starting work.
- B. Verify existing conditions prior to beginning work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- 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 using silicone bronze hardware, according to manufacturer's recommended torque settings.

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- D. Identify grounding and bonding system components in accordance with Section 260553.
 - E. Comply with NEC
 - 1. Article 250 for types, sizes, and quantities of equipment grounding conductors, except where specific types, larger sizes, or more conductors than required by NEC are indicated.
 - F. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing. Comply with NEC Article 250 for types, sizes, and quantities of equipment grounding conductors, except where specific types, larger sizes, or more conductors than required by NEC are indicated.
 - 1. Install equipment grounding conductor with circuit conductors for the items below in addition to those required by Code:
 - a. Feeders and branch circuits.
 - b. Lighting circuits.
 - c. Receptacle circuits.
 - d. Single-phase motor or appliance branch circuits.
 - G. Connections
 - 1. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 2. Exothermic-Welded (CADWELD) Connections: Use for connections to structural steel and for underground connections, except those at test wells. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
 - 3. Equipment Grounding-Wire Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs, SLUH type as manufactured by Illco. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
 - 4. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Where these requirements are not available, use those specified in UL 486A and UL 486B.
 - 5. Moisture Protection: Where insulated grounding conductors are connected to grounding rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.03 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA STD ATS except Section 4.
- B. Tests: Subject the completed grounding system to a megger test at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Measure ground resistance not less than 2 full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the 2-point method according to IEEE 81.
- C. The maximum earth resistance values shall be less than 5 ohms for the service entrance ground with the counterpoise removed and no greater for the counterpoise system when

measured alone. Earth resistance testing shall be done no sooner than 180 days after occupancy and prior to 360 days. Earth resistance testing shall be done by the manufacturer of the earthing/grounding components and shall be included in the cost of materials. Add additional ground rods as required to achieve specified value.

- D. Telecommunications Grounding System: Provide two point bonding measurement using an earth grounding resistance tester configured for a continuity test. The maximum measurement between nearest available grounding electrode and TGMB shall be 100 milliohms.
- E. Report: Prepare test reports of ground resistance at each test location. Include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- F. Inspect grounding and bonding system conductors and connections for tightness and proper installation.
- G. Perform inspections and tests listed in NETA STD ATS, Section 7.13.
- H. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- I. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

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**SECTION 260529
HANGERS AND SUPPORTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- B. Section 260533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.04 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 the contract documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS**2.01 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 electrical 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 with a minimum safety factor of 10. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
 - b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
2. Conduit Clamps: Bolted type unless otherwise indicated.
3. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com.
 - b. Erico International Corporation: www.erico.com.
 - c. Thomas & Betts Corporation: www.tnb.com.

- C. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

1. Comply with MFMA-4.
2. Channel 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 gage, 0.1046 inch.
4. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
5. Manufacturers:

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- a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Thomas & Betts Corporation: www.tnb.com/#sle.
 - c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
 - d. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.
- D. 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. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
 - c. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
 - d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
 - e. Outlet Boxes: 1/4 inch diameter.
 - f. Luminaires: 1/4 inch diameter.
- E. 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. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
 - 4. Hollow Masonry: Use toggle bolts.
 - 5. Steel: Use beam clamps, machine bolts, or welded threaded studs.
 - 6. Sheet Metal: Use sheet metal screws.
 - 7. Wood: Use wood screws.
 - 8. Plastic and lead anchors are not permitted.
 - 9. Manufacturers - Mechanical Anchors:
 - a. Hilti, Inc: www.us.hilti.com/#sle.
 - b. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com/#sle.
 - c. Powers Fasteners, Inc: www.powers.com/#sle.
 - d. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.

PART 3 EXECUTION

3.01 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.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- 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.

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- 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. Conduit Support and Attachment: Also comply with Section 260533.13.
 - I. Box Support and Attachment: Also comply with Section 260533.16.
 - J. Secure fasteners according to manufacturer's recommended torque settings.
 - K. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.
- D. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1. Size metal framing system as required for the application and structural requirements.

END OF SECTION

SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Flexible metal conduit (FMC).
- C. Liquidtight flexible metal conduit (LFMC).
- D. Electrical metallic tubing (EMT).
- E. Electrical nonmetallic tubing (ENT).
- F. Conduit fittings.
- G. Accessories.
- H. Conduit, fittings and conduit bodies.

1.02 RELATED REQUIREMENTS

- A. Section 260529 - Hangers and Supports.
- B. Section 260533.16 - Boxes for Electrical Systems.
- C. Section 260553 - Electrical Identification: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.
- C. ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC); 2005.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.
- H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.
- I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2015.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- L. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- M. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- N. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
 - 4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
 - 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.08 DESIGN REQUIREMENTS

- A. Conduit Size: ANSI/NFPA 70 or as indicated on Drawings, whichever is larger.

PART 2 PRODUCTS**2.01 CONDUIT APPLICATIONS**

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

- C. Embedded Within Concrete:
- D. Concealed Within Masonry Walls: Use electrical metallic tubing (EMT) or flexible metal conduit..
- E. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT) or flexible metal conduit..
- F. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).
- G. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- H. Connections to Vibrating Equipment:
 - 1. Dry Locations: Use flexible metal conduit.
 - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
 - 3. Maximum Length: 6 feet unless otherwise indicated.
 - 4. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.
- I. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

2.02 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Fittings for Grounding and Bonding: Also comply with Section 260526.
- C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Branch Circuits: 1/2 inch trade size.
 - 2. Control Circuits: 1/2 inch trade size.
 - 3. Underground, Exterior: 1 inch (27 mm) trade size.
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers:
 - 1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
 - 2. Electri-Flex Company: www.electriflex.com/#sle.
 - 3. International Metal Hose: www.metalhose.com/#sle.
 - 4. Or Equal.
- B. 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 to be used.
- C. Fittings:

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1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 3. Material: Use steel.
 - a. Do not use die cast zinc fittings.
 - D. Description: Interlocked steel construction.
 - E. Fittings: NEMA FB 1.

2.04 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 1. Allied Tube & Conduit: www.alliedeg.com/#sle.
 2. Republic Conduit: www.republic-conduit.com/#sle.
 3. Wheatland Tube, a Division of Zekelman Industries: www.wheatland.com/#sle.
 4. Or Equal.
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 1. Manufacturers:
 - a. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - b. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 3. Material: Use steel.
 - a. Do not use die cast zinc fittings.
 4. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.
 5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

2.05 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

- A. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.
- B. 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 the type of conduit to be connected.

2.06 COMMUNICATIONS SYSTEM CONDUITS

- A. The Electrical Contractor shall provide a complete communication raceway system as shown on drawings and in accordance with the requirements described herein.

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- B. Conduit color shall be as specified in Section 26 05 53 Identification for Electrical Systems.
 - C. Minimum conduit size shall be 3/4 inch or as indicated on the drawings. Conduit runs for communications systems shall be run in the most direct path, with the minimum amount of bends possible.
 - D. Install conduit from outlet to a location adjacent to the cable tray above the nearest accessible ceiling.
 - E. All conduit runs shall be provided with insulated bushings and a pull wire indicating the location of the opposite end.
 - F. Install conduits 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.
 - G. Conceal conduit under floor slabs and within finished walls, ceilings, and floors except where specifically indicated to be exposed.
 - 1. Conduit may remain exposed to view in mechanical rooms, electrical rooms, and telecommunications rooms.
 - 2. Treat conduit in crawl spaces and under floor slabs as if exposed to view.
 - 3. Where exposed to view, install parallel with or at right angles to ceilings, walls, and structural members.
 - 4. Under floor slabs, locate conduit at 12 inches, minimum, below vapor retarder; seal penetrations of vapor retarder around conduit.
 - H. Conduit bends shall be smooth, even, and free of kinks or other discontinuities that may have detrimental effects on pulling tension or cable integrity. Observe the following bend radii guidelines:
 - 1. For conduits with 2" or less internal diameter, the bend radius shall be at least 6 times the internal diameter.
 - 2. For conduits with greater than 2" internal diameter, the bend radius shall be at least 10 times the internal diameter.
 - I. Pullboxes shall be installed in a convenient and accessible location and shall be shown on the Contractor's record drawings. Pull boxes shall be supported independently of the associated conduits. Size pullboxes per the NEC. Pullboxes for communications conduits shall be placed in sections of conduit that:
 - 1. Are 100 feet or more in length.
 - 2. Contain more than two 90 degree bends: Provide pullbox between sections with two bends or less.
 - 3. Contain reverse bends (between 100 and 180 degrees): Insert a pull point or pull box at each bend having an angle from 100 degrees to 180 degrees.
 - J. A third bend in a conduit is acceptable in a pull section if the conduit capacity is derated by 15% or if one of the following is true:

1. The total run is not longer than 33 feet.
 2. The conduit size is increased to the next trade size.
 3. One of the bends is within 12 inches of the cable feed end where cable is pushed around the first bend.
- K. All penetrations through fire barrier walls or floors shall consist of a conduit sleeve and shall be sealed with an industry approved fire barrier caulk or compound reamed and bushed. All vertical/horizontal sleeves shall be sized according to station count passing through each. Sized for maximum 60 percent fill.

2.07 ACCESSORIES

- A. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
- B. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- C. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

2.08 FIRESTOP

- A. Provide a firestop system with an "F" rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.
 1. For penetrations by non-combustible items including steel pipe, copper pipe, rigid steel conduit, and electrical metallic tubing (EMT), the following are acceptable:
 - a. Hilti FS 601 electrometric firestop sealant or Fs 605 HP firestop sealant.
 - b. 3M fire barrier CP25.
 - c. Nelson CLK firestop sealant
 2. For fire-rated construction joints and other gaps, the following may be used:
 - a. Hilti FS 601.
 - b. 3M fire barrier CP25.
 - c. Nelson CLK firestop sealant.
 3. For penetrations by non-combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable, or cable bundles, and plastic pipe (closed piping systems), the following are acceptable:
 - a. Hilti FS 611A intumescent firestop sealant.
 - b. 3M barrier CP 25.
 - c. 3M fire barrier FS-195 wrap strip.
 - d. Nelson FSP firestop putty, PCS pipe choke system.
 4. For large complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways or raceways, the following are acceptable:
 - a. Hilti FS 635, trowelable firestop compound.
 - b. 3M fire barrier CS-195 composite sheet.
 - c. Nelson CPS composite sheet, CMP firestop compound.

PART 3 EXECUTION

3.01 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.
- D. Verify routing and termination locations of conduit prior to rough-in.
- E. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.
- D. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal all conduits unless specifically indicated to be exposed.
 - 4. 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.
 - 5. Unless otherwise approved, do not route conduits exposed:
 - a. Across floors.
 - b. Across roofs.
 - c. Across top of parapet walls.
 - d. Across building exterior surfaces.
 - e. In any finished areas.
 - 6. Arrange conduit to maintain adequate headroom, clearances, and access.
 - 7. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
 - 8. Route conduits above water and drain piping where possible.
 - 9. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
 - 10. 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.
 - 11. Group parallel conduits in the same area together on a common rack.
- E. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

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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 non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).
 9. Use of spring steel conduit clips for support of conduits is permitted only as follows:
 - a. Support of electrical metallic tubing (EMT) up to 1 inch (27 mm) trade size concealed above accessible ceilings and within hollow stud walls.
 10. Use of wire for support of conduits is not permitted.
 11. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.
- F. Connections and Terminations:
1. Use suitable adapters where required to transition from one type of conduit to another.
 2. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 3. Where spare conduits stub up through concrete floors and are not terminated in a box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
 4. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 5. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- G. 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. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Provide suitable mechanical sleeves (link seal) where conduits penetrate exterior wall below grade.
 7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.

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8. 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. Include proposed locations of penetrations and methods for sealing with submittals.
 9. Provide metal escutcheon plates for conduit penetrations exposed to public view.
 - H. 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.
 - I. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
 - J. Provide grounding and bonding in accordance with Section 260526.
 - K. Identify conduits in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL

- A. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.05 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.
- B. All conduit in finished areas shall be installed concealed in walls, floors or ceilings unless noted otherwise on the drawings. Unfinished areas are considered mechanical rooms, electrical rooms and utility spaces only.
- C. Route exposed conduit parallel and perpendicular to walls.
- D. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- E. Route conduit continuous from outlet to outlet, outlet to cabinets, outlet to pull or junction boxes. Secure conduit to all boxes with locknuts and bushings in such manner that each system is mechanically and electrically continuous throughout.
- F. Install all conduit within the building except where specifically noted or shown otherwise on the drawings.
- G. Conduit systems must be installed complete before conductors are pulled in.
- H. Repair any damage done to insulation or interior vapor barrier.

- I. Fill conduits which can admit air to or release air from air plenums through the connecting conduit system with sealing compound.
- J. Seal around all conduits passing through partitions such as walls, floor slabs and other elements. For non-rated partitions, sealant to match surrounding surface. For rated partitions, provide fireproofing sealant which preserves the fire resistant rating of the partition. Use materials and methods as directed by the manufacturer of the fireproofing and approved by the Architect/Engineer. See Architectural drawings and existing building drawings for location of new and existing fire-rated partitions.

END OF SECTION

SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Floor boxes.
- D. Wall and ceiling outlet boxes.
- E. Pull and junction boxes.

1.02 RELATED REQUIREMENTS

- A. Section 260529 - Hangers and Supports.
- B. Section 260533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- C. Section 260553 - Electrical Identification: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.
- E. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- F. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.04 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 minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.

4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 2. Use cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
 4. Use suitable masonry type boxes where flush-mounted in masonry walls.
 5. Use raised covers suitable for the type of wall construction and device configuration where required.
 6. Use shallow boxes where required by the type of wall construction.

7. Do not use "through-wall" boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
10. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices: 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
 - b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
 - c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.

2.02 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
 1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
 2. Concrete Ceiling Boxes: Concrete type.
- B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- C. Two-Gang Outlet and Smaller: Utilize 4-inch square box with tile ring or concrete-block type box. 2-1/8 inch deep minimum.
- D. Ceiling Boxes: 4 inches square, 1-1/2 inches deep, with a round tile ring.
- E. Surface Mounted Outlets: Exterior or Wet Locations.
 1. Type: Die cast aluminum with threaded hubs.
 2. Utilize for outlet boxes on exposed conduit runs.
- F. Surface Mounted Outlets: Interior Dry Locations.
 1. Type: 4-inch square boxes with matching raised covers.
 2. Utilize for outlet boxes on exposed conduit runs.
- G. Wall Plates for Finished Areas: As specified in Section 262726.

2.03 FLOOR BOXES - RECESSED

- A. Walker RFBA series, Thomas & Betts 665 or 667 series or equal.
- B. Gangs: 4
- C. Floor Boxes: UL514A and UL514C to meet scrub water exclusion when used on tile, terrazzo, wood and carpet floors.
- D. Material: Cast metal, fully adjustable, 3 7/16 inches (87 mm) deep.
- E. Four independent wiring compartments, two for power, two for communications.
- F. Brackets: Two duplex receptacle and two, (4) gang RJ45 brackets. Provide GFCI or blank brackets as required for the installation.
- G. Covers:

1. Flanged die-cast aluminum assembly with brushed aluminum finish. Lid area to be flush with finished floor, no cutouts.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- E. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- F. Box Locations:
 1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.
 2. Unless dimensioned, box locations indicated are approximate.
 3. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
 - b. Communications Systems Outlets: Comply with Section 27 1005.
 4. Locate boxes so that wall plates do not span different building finishes.
 5. Locate boxes so that wall plates do not cross masonry joints.
 6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
 7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
 8. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
 9. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
 - a. Concealed above accessible suspended ceilings.
 - b. Within joists in areas with no ceiling.
 - c. Electrical rooms.

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- d. Mechanical equipment rooms.
- G. Box Supports:
- 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
 - 4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.
- H. Install boxes plumb and level.
- I. Flush-Mounted Boxes:
- 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
 - 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 - 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- J. Install firestopping to preserve fire resistance ratings of partitions and other elements.
- K. Close unused box openings.
- L. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- M. Provide grounding and bonding in accordance with Section 260526.
- N. All boxes shall be installed flush in finished spaces unless noted otherwise. Unfinished spaces include mechanical, electrical and utility rooms only.
- O. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- P. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.
- Q. Set wall mounted boxes at elevations to accommodate mounting heights indicated on the drawings or specified unless noted otherwise.
- R. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
- 1. Adjust box locations up to 10 feet if required to accommodate intended purpose.
- S. Maintain headroom and present neat mechanical appearance.
- T. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

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- U. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
 - V. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes and mechanical radiation.
 - W. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
 - X. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
 - Y. Use flush mounting outlet box in finished areas.
 - Z. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
 - AA. Use adjustable steel channel fasteners for hung ceiling outlet box.
 - BB. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
 - CC. Use surface mounted 4-inch square box with matching raised cover on exposed conduit runs.
 - DD. Use gang box where more than one device is mounted together. Do not use sectional box. Do not use handy box.
 - EE. Use cast outlet box in exterior locations exposed to the weather and wet locations.
 - FF. Set floor boxes level.
 - GG. Surface mounted outlets are permitted only in mechanical and electrical rooms and above removable ceilings, or where installed on existing exterior precast walls.
 - HH. Boxes protruding from the finished wall will not be accepted.
 - II. Install outlets in similar rooms in the same relative location in each room.
 - JJ. Locate outlets to clear piping, duct work and other obstructions.
 - KK. Install switch outlets within 6 inches of latch side of door except where type of construction dictates otherwise.
 - LL. Mounting heights indicated on Drawings are to center line of outlet unless indicated otherwise.
 - MM. Mount duplex receptacle outlets noted to be "A.C." (above counter) 3 inches above the top of the countertop backsplash. Adjust outlet mounting height to agree with required location for equipment served.
 - NN. Pull boxes and junction boxes are not indicated on Drawings except for special requirements. Install as required to facilitate pulling wire. Size as required by National Electric Code. Install above removable ceilings, electrical rooms, utility rooms or storage areas in accessible locations. Installation in finished spaces not permitted without approval of the Architect/Engineer.
 - OO. Do not mount junction boxes or pull boxes to duct work, ceiling system or other piping. Mount from structural system only. Mount independent of conduit system. Junction boxes supported only from conduit system will not be permitted.

PP. Label all junction box covers with panelboard name and circuit numbers for circuits in junction box. Label all junction box covers with the type of communication systems contained within; example: "Nurse Call," "Security," etc. See section 26 0553 - Electrical Identification.

3.03 ADJUSTING

- A. Adjust floor boxes flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

3.04 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

END OF SECTION

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**SECTION 260553
ELECTRICAL IDENTIFICATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Device and Junction Box Labels
- D. Factory pigmented conduit.

1.02 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
 - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
 - 2. Do not install identification products until final surface finishes and painting are complete.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.05 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.
- B. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.

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- 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - 6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - 7) High Leg Identification: Identify panelboards containing a 4-wire, delta connected system per NFPA 70, Article 408.3(f).
 - b. Enclosed switches:
 - 1) Identify voltage and phase.
 - 2) Identify power source and circuit number. Include location when not within sight of equipment.
 - 3) Identify load(s) served. Include location when not within sight of equipment.
 2. Service Equipment:
 - a. Use identification nameplate to identify each service disconnecting means.
 - b. For buildings or structures supplied by more than one service, or any combination of branch circuits, feeders, and services, use identification nameplate or means of identification acceptable to authority having jurisdiction at each service disconnecting means to identify all other services, feeders, and branch circuits supplying that building or structure. Verify format and descriptions with authority having jurisdiction.
 - c. Use identification nameplate at each piece of service equipment to identify the available fault current and the date calculations were performed.
 3. 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.
 4. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
- C. Identification for Raceways:
1. Use pigmented conduit to identify specified systems for accessible conduits at maximum intervals of 20 feet.
 2. Provide pigmented conduit for the following systems:
 - a. Fire Alarm System: Red
 - b. Telephone, Data Network, Television System: Orange
 3. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
- D. Identification for Boxes:
1. Use color coded boxes to identify specified systems.
 - a. Field paint in accordance with Section 09 9000 per the same color code used for raceways.

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2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
 - a. For exposed boxes in public areas, use only identification labels.
 - E. Identification for Devices:
 1. Communications Systems: Use identification label to indicate system contained within, 'Public Address', 'Television', etc.
 2. Use identification label to identify serving branch circuit for all receptacles.
 3. Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.
 4. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.

2.02 MANUFACTURERS

- A. Brady Corporation: www.bradycorp.com.
- B. Seton Identification Products: www.seton.com/aec.
- C. HellermannTyton: www.hellermannntyton.com.
- D. Or Equal.

2.03 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 1. Manufacturers:
 - a. Brimar Industries, Inc: www.brimar.com.
 - b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com.
 - c. Seton Identification Products: www.seton.com.
 2. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
 4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
 5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
 6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
 1. Manufacturers:
 - a. Brady Corporation: www.bradyid.com.
 - b. Brother International Corporation: www.brother-usa.com.
 - c. Panduit Corp: www.panduit.com.

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2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
 2. Legend:
 - a. System designation where applicable:
 - 1) Emergency Power System: Identify with text "EMERGENCY".
 - 2) Fire Alarm System: Identify with text "FIRE ALARM".
 - b. Equipment designation or other approved description.
 - c. Other information as indicated.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height:
 - a. System Designation: 1 inch.
 - b. Equipment Designation: 1/2 inch.
 - c. Other Information: 1/4 inch.
 - d. Exception: Provide minimum text height of 1 inch for equipment located more than 10 feet above floor or working platform.
 5. Color:
 - a. Normal Power System: White text on black background.
- D. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
 2. Legend: Power source and circuit number or other designation indicated.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height: 3/16 inch.
 5. Color: Black text on clear background.
- E. Format for Control Device Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
 2. Legend: Load controlled or other designation indicated.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height: 3/16 inch.
 5. Color: Black text on clear background.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.
- B. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:

1. Surface-Mounted Equipment: Enclosure front.
 2. Branch Devices: Adjacent to device.
 3. Interior Components: Legible from the point of access.
 4. Boxes: Outside face of cover.
 5. Conductors and Cables: Legible from the point of access.
 6. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Mark all handwritten text, where permitted, to be neat and legible.

3.03 FIELD QUALITY CONTROL

- A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.
- B. Provide self-adhesive labels on all receptacles by identifying the panel name and circuit number, example: H1-24.
- C. Provide self-adhesive labels on all junction box covers to identify the circuits contained within for all power circuits or the system contained within for all communications systems. Example: 'Paging System'.

END OF SECTION

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SECTION 260583
WIRING CONNECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical connections to Division 22 and 23 mechanical equipment.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Conductors.
- B. Section 260533.13 - Conduit for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.

1.03 REFERENCE STANDARDS

- A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R 2010).
- B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2012.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
 - 2. Determine connection locations and requirements.
- B. Sequencing:
 - 1. Install rough-in of electrical connections before installation of equipment is required.
 - 2. Make electrical connections before required start-up of equipment.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.06 COORDINATION

- A. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- B. Determine connection locations and requirements.
- C. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- D. Sequence electrical connections to coordinate with start-up of equipment.
- E. Install controllers and disconnect switches in mechanical rooms in accessible locations.
Coordination installation locations with Division 22 or 23 contractor.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.

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1. Colors: Conform to NEMA WD 1.
 2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
 3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
- B. Flexible Conduit: As specified in Section 260533.13.
1. Provide flexible conduit connections to equipment that must be removed for repair or maintenance.
 2. Where moist conditions are encountered such as in dishwashing areas, provide PVC jacketed flexible conduit.
- C. Wire and Cable: As specified in Section 260519.
- D. Boxes: As specified in Section 260533.16.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.
- B. Verify mounting locations for controllers and disconnect switches. Coordinate with Division 22 and 23 equipment locations.

3.02 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered. Do not use wire having a rating less than 90 degrees C.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Review floor plan drawings and motor and equipment schedule on the plans. The floor plans indicate the location of the equipment only, the schedule calls out all connection, disconnect and controller requirements.
- K. Provide a disconnecting means within sight of all motors and equipment as required by the latest edition of the NEC.

END OF SECTION

**SECTION 260943
LIGHTING CONTROL SYSTEMS**

PART 1 - GENERAL

1.01 SUMMARY

- A. Lighting control system.
- B. Standalone lighting control devices.

1.02 RELATED SECTIONS

- A. Section 26 51 00 - Lighting.

1.03 REFERENCES

- A. NFPA 70 - National Electrical Code; National Fire Protection Association.
- B. NEMA - National Electrical Manufacturers Association
- C. FCC emission standards
- D. UL - Underwriters Laboratories, Inc. Listings
- E. UL 2043 - Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products Installed in Air-Handling Spaces.
- F. UL 924 - Standard for Emergency Lighting and Power Equipment
- G. ULC - Underwriter Laboratories of Canada Listings

1.04 PERFORMANCE REQUIREMENTS

- A. Lighting Control System shall accommodate the square-footage coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors, switches, daylighting sensors and accessories that suit the required lighting and electrical system parameters.
- B. System shall conform to requirements of NFPA 70.
- C. System shall comply with FCC emission standards specified in part 15, sub-part J for commercial and residential application.
- D. System shall be listed under UL sections 916 and/or 508.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01 3000.
- B. Product Data: For each type of product (general device descriptions, dimensions, individual wiring details, nomenclature).
 - 1. Bill of Materials: Complete list of all parts needed to fully install selected system components.
- C. Shop Drawings:
 - 1. Floor Plans: Location, orientation, and coverage area of each sensor; groups; zones; scenes; and other specific design symbols and designations as required to define the installation, location, and configuration of all control devices.
 - 2. Point List and Data Bus Devices: Summary list of all control devices, sensors, and other devices connected to each data bus. Include remaining future device capacity of data bus.

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3. Wire Termination Diagrams and Schedules: Coordinate nomenclature and presentation with Drawings and block diagram. Differentiate between manufacturer-installed and field-installed wiring.
 4. Coordination Drawings: Submit evidence that lighting controls are compatible with connected monitoring and control devices and systems specified in other Sections.
 5. Show interconnecting signal and control wiring, and interface devices that prove compatibility of inputs and outputs.
 6. Room Interconnection Diagrams: Typical per room type (detailed drawings showing device interconnectivity of devices).
- D. Example Contractor Startup/Commissioning Worksheet: Must be completed prior to factory start-up.
 - E. Field quality-control reports.
 - F. Software licenses and upgrades required by and installed for operation and programming of digital and analog devices.

1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
- B. As-Built Drawings: Shop drawings upgrade to reflect installed conditions.

1.07 QUALITY ASSURANCE

- A. In high humidity or cold environments, the sensors shall be rated for condensing humidity and -40 deg F operation.
- B. All applicable products must be UL/CUL Listed or other acceptable national testing organization.
- C. Contractor shall ensure that lighting system control devices and assemblies are fully compatible and can be integrated into a system that operates as described in the lighting control notes on drawings and as described within this specification. Any incompatibilities between devices, fixtures, and system controllers shall be resolved between the Contractor and the system provider, as required to ensure proper system operation and maintainability.

1.08 COORDINATION

- A. Coordinate lighting control components to form an integrated interconnection of compatible components.
- B. The installing contractor shall be responsible for a complete and functional system in accordance with all applicable local and national codes.
- C. Comply with UL 916.

1.09 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of lighting controls that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Software: Failure of input and output to execute switching or dimming commands.
 - b. Failure of modular relays to operate under manual or software commands.

- c. Device failure.
 - d. Damage of electronic components due to transient voltage surges.
- 2. Warranty Periods:
 - a. Control Components: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 LIGHTING CONTROL SYSTEM

A. MANUFACTURERS

- 1. nLight® Network Control System from Sensor Switch.
- 2. Wattstopper.
- 3. Cooper Intelligent Lighting Controls, ILC.
- 4. Approval prior to bid required for other manufacturers.

B. SYSTEM REQUIREMENTS

- 1. Operation: Input signal from digital signal sources, switches, sensors, or other devices associated with signal input.
 - a. Each input and control device is connected to a digital data bus.
 - b. Each device has a digital address and can be operated by a digital signal.
 - c. Each device can be assigned to any or all groups connected to a single data bus.
 - d. Each dimming device may have as many as 20 lighting levels in 5 percent increments.
 - e. Scenes can be programmed to devices and may be applied to groups.
- 2. System Requirements:
 - a. Components: Individually addressable control devices (such as relays, dimmers, and switches) that are operated from digital signals received through a data bus, from data-entry and -retrieval devices (such as PCs, hand-held infrared programming devices, and wired network connections). Devices also report status to data-entry and -retrieval devices through the bus.
 - b. Fixture Independence: Addressable control devices shall be mounted separately from the fixture and shall not be integrated into the fixture in manufacturing/assembly. Future removal of the addressable control device shall not require removal of the fixture, and future removal of the fixture shall not require removal of the addressable control device.
 - c. Digital Control: Use peer-to-peer communication and distributed logic, where the failure of any single component within a scope shall be automatically isolated and not affect function of other spaces.
- C. Each lighting control zone shall be set for default stand-alone operation without any start-up programming.
- D. System shall be capable of operating a lighting control zone according to several sequences of operation. S Note operating modes should be utilized only in manners consistent with local energy codes.
 - 1. Auto-On/Auto-Off (via occupancy sensors):
 - a. Zones with occupancy sensors automatically turn lights on when occupant is detected.

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- b. Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
 - c. Pressing a switch will turn lights off. The lights will remain off regardless of occupancy until switch is pressed again or the occupancy sensor times out, restoring the sensor to Automatic On functionality.
 - 2. Manual-On/Auto-Off (also called Semi-Automatic):
 - a. Pushing a switch will turn lights on.
 - b. Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
 - 3. Manual-On to Auto-On/Auto-Off:
 - a. Pushing a switch will turn lights on.
 - b. After initial lights on, zones with occupancy and/or photocell sensors turn lights on/off according to occupancy/vacancy and/or daylight conditions.
 - c. Sequence can be reset via scheduled (ex. daily each morning) events
 - E. LED FIXTURE SWITCHING AND DIMMING
 - 1. Each device or zone shall be addressable and shall include on/off, fade, dimming, scene settings, and other standard control functions as required to meet the Lighting Control Schedule functions. Control outlet and wiring shall be compatible with fixtures specified.
 - 2. Drivers: Comply with requirements in Division 26 "Interior Lighting" for LED and the following:
 - a. Dimming Range: 100 to 5 percent of rated lumens, unless fixture specified is capable of lower output (match fixture).
 - b. Input Voltage Range: 108 to 305V.
 - F. DIGITAL OCCUPANCY SENSORS
 - 1. Sensors may be powered directly from the lighting control network. All sensors shall be digital.
 - 2. General Description: Ceiling-mounting, solid-state low voltage units.
 - a. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 20 minutes. Automatic sensitivity adjustment.
 - b. Sensor Type: Sensors shall be dual-technology type (unless noted otherwise).
 - 1) Corridors and Vestibules: PIR type sensors are acceptable.
 - c. Mounting:
 - 1) Sensor: Suitable for mounting on a standard box.
 - 2) Time-Delay and Sensitivity Adjustments: Recessed and concealed behind accessible cover.
 - d. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
 - e. Bypass Switch: Override the on function in case of sensor failure.
 - 3. Connection to lighting control local network.
 - 4. PIR Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.

- a. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in..
- 5. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic/microphonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.
 - a. Sensitivity Adjustment: Separate for each sensing technology.
 - b. Detector Sensitivity: Detect occurrences of 6-inch-minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
- 6. Units shall not have any dip switches or potentiometers for field primary settings.

G. MANUAL SWITCHES AND PLATES

- 1. Push-Button Switches: Modular, operating over the digital data bus.
 - a. Each switch shall control the following functions, in coordination with lighting control schedule functions:
 - 1) On.
 - 2) Off.
 - 3) Dimming, increase light level.
 - 4) Dimming, decrease light level.
 - 5) Return to preset light level.
 - b. Match color and style specified in Division 26 Section "Wiring Devices."
 - c. Integral IR receiver for programming.
- 2. Wall Plates: Single and multigang plates as specified in Division 26 Section "Wiring Devices."

H. CONDUCTORS AND CABLES

- 1. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG, complying with Division 26 Section "Conductors and Cables for Electrical."
- 2. Class 2 Control Cables: Multiconductor cable with copper conductors sized per manufacturer for circuit load and voltage conditions.
- 3. Class 1 Control Cables: Multiconductor cable with copper conductors sized per manufacturer for circuit load and voltage conditions.
- 4. Digital and Multiplexed Signal Cables: Unshielded, twisted-pair cable with copper conductors, complying with TIA/EIA-568-B.2, for horizontal copper cable. Manufacturer may select cable Category (5e, 6, etc.).
- 5. All cables shall be plenum rated.
- 6. Where composite cables require more than two conductors, provide manufacturer's factory pre-terminated cable to connected lighting control devices. Cabling shall be plenum rated.
- 7. Cable Color Code: Coordinate cable color to be unique from other building systems and match existing when applicable.
- 8. Provide minimum 8 ft. slack in each cable segment for flexibility of device location adjustment.

2.02 STANDALONE CONTROL DEVICES**A. LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS**

1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

B. ALL OCCUPANCY SENSORS:

1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
2. Sensor Technology:
 - a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
 - b. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.
3. Provide LED to visually indicate motion detection.
4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
5. Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.
6. Turn-Off Delay: Field adjustable.
7. Sensitivity: Field adjustable.
8. Integral Photocell: For field selectable and adjustable inhibition of automatic turn-on of load when ambient lighting is above the selected level.
9. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers,
10. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on the drawings.
11. Isolated Relay for Low Voltage Occupancy Sensors: SPDT dry contacts, ratings as required for interface with system indicated.

C. WALL OCCUPANCY SENSORS:

1. All Wall Switch Occupancy Sensors:
 - a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
 - b. Unless otherwise indicated or required to control the load indicated on the drawings, provide line voltage units with self-contained relay.
 - c. Where indicated, provide two-circuit units for control of two separate lighting loads, with separate manual controls and separately programmable operation for each load.

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- d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
 - e. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
 - f. Finish: Match finishes specified for wiring devices in Section 26 2726, unless otherwise indicated.
 - g. Provide vandal resistant lenses for passive infrared (PIR) wall switch occupancy sensors.
 - 2. Passive Infrared (PIR) Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet.
 - D. CEILING MOUNTED OCCUPANCY SENSORS:
 - 1. All Ceiling Mounted Occupancy Sensors:
 - a. Description: Low profile occupancy sensors designed for ceiling installation.
 - b. Unless otherwise indicated or required to control the load indicated on the drawings, provide low voltage units, for use with separate compatible accessory power packs.
 - c. Provide field selectable setting for disabling LED motion detector visual indicator.
 - d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
 - e. Finish: White unless otherwise indicated.
 - 2. Ultrasonic Ceiling Mounted Occupancy Sensors:
 - a. Standard Range Sensors: Capable of detecting motion within an area of 500 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
 - E. DUAL TECHNOLOGY WALL DIMMER VACANCY SENSOR:
 - 1. Products:
 - a. Acuity Brands - Sensor Switch: WSX PDT Series.
 - 2. Description: Wall mounted 0-10V dimming dual technology vacancy sensor.
 - 3. Capable of detecting motion within an area of 525 SqFt.
 - 4. Unless otherwise indicated or required to control the load indicated on the drawings, provide line voltage units with self-contained relay.
 - 5. Finish: Match finishes specified for wiring devices in Section 26 2726, unless otherwise indicated.
 - F. ROOM CONTROLLERS
 - 1. Room Controllers: Digital controllers for lighting zones, fixtures and/or plug loads automatically bind room loads to the connected control devices in the space without commissioning or the use of any tools. Provide controllers to match the room lighting and plug load control requirements. Controllers are simple to install, and do not have dip switches/potentiometers, or require special configuration for standard Plug n' Go applications. Control units include the following features
 - a. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room or factory preprogrammed.
 - b. Simple replacement using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf device.

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- c. Multiple room controllers connected together in a local network must automatically or be factory preprogrammed arbitrate with each other, without requiring any configuration or setup, so that individual load numbers are assigned starting with load 1 to a maximum of 64, assigned based on each controller's device ID's from highest to lowest.
 - d. Device Status LEDs to indicate:
 - 1) Data transmission
 - 2) Device has power
 - 3) Configuration status
 - e. Quick installation features including:
 - 1) Standard junction box mounting
 - 2) Quick low voltage connections using standard RJ-45 patch cable
 - f. Based on individual configuration, each load shall be capable of the following behavior on power up following the loss of normal power:
 - 1) Turn on to 100 percent
 - 2) Turn off
 - 3) Turn on to last level
 - g. Each load be configurable to operate in the following sequences based on occupancy:
 - 1) Auto-on/Auto-off (Follow on and off)
 - 2) Manual-on/Auto-off (Follow off only)
 - h. UL 2043 plenum rated
 - i. Manual override and LED indication for each load
 - j. Zero cross circuitry for each load
 - k. All digital parameter data programmed into an individual room controller or plug load controller shall be retained in non-volatile FLASH memory within the controller itself. Memory shall have an expected life of no less than 10 years.
2. On/Off/0-10V Dimming Room Controllers shall include:
- a. Dual voltage (120/277 VAC, 60 Hz) capable or 347 VAC, 60 Hz. 120/277 volt models rated for 20A total load; 347 volt models rated for 15A total load
 - b. Built in real time current monitoring
 - c. One, two or three relays configurations
 - d. Four RJ-45 local network ports or screw terminals. Provide integral strain relief
 - e. One dimming output per relay
 - 1) 0-10V Dimming - Where indicated, one 0-10 volt analog output per relay for control of compatible ballasts and LED drivers. The 0-10 volt output shall automatically open upon loss of power to the Room Controller to assure full light output from the controlled lighting.
- G. POWER PACKS FOR LOW VOLTAGE OCCUPANCY SENSORS:
- 1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.

2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on the drawings.
3. Input Supply Voltage: Dual rated for 120/277 VAC.
4. Load Rating: As required to control the load indicated on the drawings.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Engage manufacturer's representative to select devices, quantities, locations, and interconnecting cabling to achieve the control sequence specified in the lighting control schedule.
- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of lighting control devices provided under this section.
 1. Mounting Heights: Unless otherwise indicated, as follows:
 - a. Wall Switch Occupancy Sensors: 48 inches above finished floor.
 2. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.
 3. Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
- C. Wiring:
 1. Comply with NECA 1.
 2. Wiring Method: Install cables in raceways except where installed in accessible ceilings. Conceal raceway and cables except in unfinished spaces. Support cables at intervals not exceeding 30".
 3. Route all low voltage cables separate from line-voltage conductors.
 4. Conductor/Cable Coordination: Verify and coordinate quantity and configuration of line voltage conductors and/or low voltage cables needed to interconnect dimming control devices with associated lighting fixtures. Control method shall match. Note that dimming methods may require different conductor/cable configurations be used for different fixtures.
 5. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- D. Wall Devices:
 1. Provide junction box in wall with conduit stubbed up above nearest accessible ceiling space.
 2. Where cabling is routed in inaccessible locations (above hard ceilings, within floors, within walls), provide conduit routed from device to nearest accessible ceiling space.
- E. Sensors:
 1. Select, install, and aim sensors to achieve not less than 90 percent coverage of installed areas. Do not exceed coverage limited specified in manufacturer's written instructions.
 2. Adjust location of sensors to minimize activation of interior rooms from adjacent corridor activity per manufacturer's direction.

3. Arrange control zones per plans and details. Individual rooms (defined by full height wall partitions or doors) shall be controlled independent of adjacent rooms. Multiple occupancy sensors in the same room or zone shall control all lighting fixtures associated with that room or zone. Rooms or zones shown with multiple branch circuits shall be provided with multiple control devices to accommodate control sequence.
 4. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.
 5. Locate ultrasonic occupancy sensors a minimum of 4 feet from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.
 6. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.
- F. Programmer: provide Owner with one handheld programmer if required for configuration of room controllers and lighting system settings.

3.02 IDENTIFICATION

- A. Identify system components, wiring, cabling, boxes, cabinets, and terminals. Comply with identification requirements specified in Division 26 Section "Electrical Identification."
- B. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with Division 26 Section "Electrical Identification."
- C. Identify all ceiling-mounted controls with data bus number and device address.
- D. Label each device cable within 6 inches of connection to wiring terminals/ports.

3.03 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
 1. Test continuity of each circuit.
- B. Engage a factory-authorized service representative to perform startup service.
 1. Complete installation and startup checks according to manufacturer's written instructions.
 2. Activate light fixtures and verify that all fixtures are operating at 100 percent.
 3. Confirm correct communications wiring, initiate communications between devices and controller/gateways, and program the lighting control system according to approved configuration schedules, time-of-day schedules, and input override assignments.
 4. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Field Test Reports:
 1. Printed list of all points created from actual queries of all addressed control points to include ballasts, manual controls, and sensors.
 2. Event log verifying the performance of all devices generating event messages to include occupancy sensors, control buttons, alarm messages, and any other change of value messages.
- D. Lighting controls will be considered defective if they do not pass tests and inspections.

-
- E. Prepare test and inspection reports, including a certified report that identifies bus controllers included and describes query results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.
 - F. Test and Inspection Report:
 - 1. Perform tests/inspections and submit report prior to Engineer's final punch inspection.
 - 2. Report shall consist of any developed test result data and shall, at minimum, include a copy of this "Field Quality Control" Section of the specification to illustrate Contractor acknowledgement of tests and inspections.
 - a. Contractor shall indicate successful completion by initialing individual test and inspection requirements listed above on the copy. Initialing indicates that tests and inspections were performed for specified work with a successful outcome. Work not found to be in compliance was corrected and retested/reinspected successfully or has been specifically clarified and noted above by the Contractor.
 - G. Upon completion of initial programming, engage engineer, architect, and Owner while on site to confirm time and scene controls/adjustments prior to final programming. Provide 2 weeks notice. Time may be required outside of normal business hours to confirm lighting for those hours of operation.

3.04 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions and to assist Owner's personnel in making program changes. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
- B. Adjust devices and wall plates to be flush and level.
- C. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.

3.05 DEMONSTRATION

- A. Training: Train owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Location: At project site.

END OF SECTION 26 0943

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SECTION 262726
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Wall plates.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260533.16 - Boxes for Electrical Systems.
- C. Section 260553 - Electrical Identification: Identification products and requirements.
- D. Section 260923 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.

1.03 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification; Revision G, 2001.
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); Federal Specification; Revision F, 1999.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R 2010).
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2012.
- 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.

1.04 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 placement of outlet boxes for wall switches with actual installed door swings.

4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. 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.
- D. Operation and Maintenance Data:
 1. GFCI Receptacles: Include information on status indicators.
- E. Project Record Documents: Record actual installed locations of wiring devices.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hubbell Incorporated: www.hubbell-wiring.com.
- B. Lutron Electronics Company, Inc: www.lutron.com.
- C. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us
- D. Cooper Wiring Devices: www.cooperwiringdevices.com.
- E. Approved equal.
- F. Source Limitations: Where possible, for each type of wiring device furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.
- D. Provide tamper resistant receptacles for receptacles installed in bedrooms and bathrooms. See drawings for other required locations.

- E. Provide GFCI protection for receptacles installed within 6 feet of sinks.
- F. Unless noted otherwise, do not use combination switch/receptacle devices.

2.03 WIRING DEVICE FINISHES

- A. Provide wiring device finishes as described below unless otherwise indicated.
- B. Finishes:
 - 1. Wiring Devices Installed in Finished Spaces: Gray with stainless steel wall plate unless otherwise indicated.
 - 2. Wiring Devices Installed in Unfinished Spaces: Gray with galvanized steel wall plate unless otherwise indicated.
 - 3. Wiring Devices Installed in Wet or Damp Locations: Gray with specified weatherproof cover unless otherwise indicated.

2.04 WALL SWITCHES

- A. Wall Switches - 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. Rated 1 horsepower at 120 volts, 2 horsepower at 277 volts

2.05 RECEPTACLES

- A. Receptacles - 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.
- B. 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 SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- C. GFCI Receptacles:
 - 1. GFCI Receptacles - 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.
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 SE suitable for installation in damp or wet locations.
4. Tamper Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as tamper resistant type.

2.06 WALL PLATES

- A. Wall Plates: Comply with UL 514D.
 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 2. Size: Standard.
 3. Screws: Metal with slotted heads finished to match wall plate finish.
- B. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
- C. Provide labeling of plate with panelboard and circuit number.

PART 3 EXECUTION

3.01 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 floor boxes are adjusted properly.
- F. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- G. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 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 260533.16 as required for installation of wiring devices provided under this section.
 1. Mounting Heights: Unless otherwise indicated, as follows:
 - a. Wall Switches: 48 inches above finished floor.
 - b. Receptacles: 18 inches above finished floor or 6 inches above counter.
 2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.

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3. Provide minimum of 24 inches horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.
 4. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
 5. Provide separate outlet boxes for wiring devices connected to emergency power and normal power systems.
 6. Unless otherwise indicated, provide separate outlet boxes for line voltage and low voltage devices.
 7. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
 8. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.
 9. Locate outlet boxes so that wall plate does not span different building finishes.
 10. Locate outlet boxes so that wall plate does not cross masonry joints.
- 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 securely, in a neat and workmanlike manner, as specified in NECA 1.
 - J. Install wiring devices plumb and level with mounting yoke held rigidly in place.
 - K. Install wall switches with OFF position down.
 - L. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
 - M. Connect dimmers within same room to the same phase of power distribution system.
 - N. Do not share neutral conductor on branch circuits utilizing wall dimmers.
 - O. Install vertically mounted receptacles with grounding pole on bottom and horizontally mounted receptacles with grounding pole on left.
 - P. 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.

- Q. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- R. Install identification label for wall switches and wall dimmers in accordance with Section 260526 indicating load served when controlling loads that are not visible from the control location or multiple wall switches or wall dimmers are installed at one location.
- S. Install identification label for all receptacles in accordance with Section 260526 indicating serving branch circuit.
- T. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.
- U. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- V. Connect wiring devices by wrapping conductor around screw terminal.
- W. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.04 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 to obtain mounting heights specified and indicated on drawings.
- B. Install convenience receptacle 18 inches above finished floor in finished areas.
- C. Install data / telephone jack 18 inches above finished floor.
- D. Install telephone jack for wall telephone to position top of telephone at 48 inches above finished floor.

3.05 FIELD QUALITY CONTROL

- A. Inspect each wiring device for damage and defects.
- B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- C. Operate each wall switch with circuit energized and verify proper operation.
- D. Verify that each receptacle device is energized.
- E. Test each receptacle to verify operation and proper polarity.
- F. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- G. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.06 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust the time delays, sensitivity and other settings on occupancy sensors as directed.

3.07 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

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SECTION 262790
ELECTRIC SPACE HEATING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section includes the furnishing and installation of the following:
 - 1. Electric unit heaters.
 - 2. Fan forced heaters.

1.02 REFERENCES

- A. A. NEMA DC 3 - Low Voltage Room Thermostats.
- B. B. NEMA DC 15 - Line Voltage Room Thermostats.

1.03 SUBMITTALS

- A. Submit under provisions of Section 01 3000.
- B. Product Data: Provide unit size, finish, and performance data.
- C. Submit manufacturer's installation instructions.

1.04 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 26 0500.
- B. Operation Data: Include instructions for safe operating procedures.
- C. Maintenance Data: Include instructions for replacement parts and troubleshooting diagnostics.
- D. Include recommended cleaning methods, cleaning materials, and waxes for interior parts and exterior finishes

1.05 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Shop Drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Berko, Qmark.

2.02 ELECTRIC UNIT HEATERS

- A. Description: Electric unit heater for suspended mounting, with fan forced air distribution over electric resistance heating coils and horizontal discharge.
- B. Input Voltage: As indicated on Drawings.
- C. Output Rating: As indicated on Drawings.
- D. Heating Element: Exposed helical coil of nickel-chrome resistance wire with refractory ceramic support bushings.
- E. Provide line voltage disconnect switch for each input circuit.
- F. Fabrication: Fabricate cabinet of heavy welded steel.
- G. Provide captive-screw held panel for electrical connection and control compartment.

- H. Provide internal shroud around heating elements to assure uniform air flow and delivery temperature across heater face.
- I. Provide suitable fan blade protection using wire guard.
- J. Cabinet Finish: Manufacturer's standard finish.
- K. Provide low voltage control transformer.
- L. Operating Stages: One.
- M. Provide terminal blocks for power and control wiring connections.
- N. Louver: Provide discharge louver with individually adjustable blades.

2.03 FAN FORCED HEATERS

- A. Description: Recessed wall-mounted cabinet heater with fan forced air distributed over resistance heating element. Berko FRA series or equal by Qmark.
- B. Input Voltage: As indicated on Drawings.
- C. Output Rating: As indicated on Drawings.
- D. Steel finned metal sheath heating elements.
- E. Provide line voltage disconnect switch to directly control heater element. Provide with integral thermal protection and fan delay switch.
- F. External Thermostat by Division 23. Provide relay for interface with remote 24V thermostat.
- G. Provide 14 gauge security front cover.
- H. Finish: Satin aluminum frame with northern white baked enamel grill finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify that required utilities are available, in proper location, and ready for use.
- C. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Locate each unit in position indicated.
- C. Install unit with sufficient clearance from adjacent construction, piping, ductwork, and other obstructions to allow access for service and maintenance.
- D. Support unit heaters from structure using construction details shown on Drawings.

3.03 FIELD QUALITY CONTROL

- A. Verify operation of each electric heating unit by measuring input voltage and current simultaneously for period of ten minutes of continuous operation.

3.04 DEMONSTRATION

- A. Provide systems demonstration under provisions of Section 26 0500.

- B. Demonstrate location of circuit breakers and switches serving electric heating branch circuits, and location and setting procedures for thermostats and other heating controls.

END OF SECTION

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**SECTION 265100
INTERIOR LIGHTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Exit signs.
- D. LED Drivers

1.02 RELATED REQUIREMENTS

- A. Section 26 0533.16 - Boxes.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 262726 - Wiring Devices: Manual wall switches and wall dimmers.

1.03 REFERENCE STANDARDS

- A. ANSI C78.379 - American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns; 2006.
- B. ANSI C82.1 - American National Standard for Lamp Ballast - Line Frequency Fluorescent Lamp Ballast; 2004.
- C. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low Pressure Sodium Lamps (Multiple-Supply Type); 2002.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- E. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association; 2006.
- F. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association; 2006.
- G. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; National Electrical Manufacturers Association; 2006.
- H. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association; 2012.
- J. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- K. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- L. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 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. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
 - 4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

- A. See Section 013000 - 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.
- 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. Lamps: Include rated life, color temperature, color rendering index (CRI), and initial and mean lumen output.
- 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. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Conform to requirements of NFPA 70 and the International Building Code (IBC), locally adopted version.

1.07 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.

1.08 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY

- A. Provide a five year full warranty on all LED light fixtures including the driver.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS**2.01 LUMINAIRE TYPES**

- A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 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 that comply with requirements of NFPA 70 and NFPA 101.
- D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- E. 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.
- F. 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.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- H. Recessed Luminaires:
 - 1. Ceiling Compatibility: Comply with NEMA LE 4.
 - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
- I. LED Luminaires: Listed and labeled as complying with UL 8750.
 - 1. Photometric measurements indicated on the product data shall be provided in accordance with IESNA LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting products and shall meet the requirements specified and/or indicated on the drawings.
 - 2. Lumen data indicated on the product data sheets shall be generated in accordance with IESNA LM-80-08 Approved Method for Measuring Lumen Maintenance of LED Light Sources and shall meet the requirements specified and/or indicated on the drawings.
 - 3. Lumen depreciation shall be identified in terms of IES TM-21-11. Unless noted otherwise, luminaires shall provide a minimum L70 rating at the drive current provided product data shall indicate such.

4. Correlated color temperature (CCT) indicated on the product data sheets shall be provided in accordance with ANSI C78.377-2008 American National Standard for Electric Lamps requirements specified and/or indicated on the drawings. Acceptable variation in color temperatures specified shall be +/- 275 degrees Kelvin.
5. Lumen output specified shall be lumens delivered from the luminaire at the color temperature specified.
6. Luminaires efficacy shall meet that specified and scheduled at the CCT specified.

2.03 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
 1. Sealed maintenance-free nickel cadmium unless otherwise indicated.
 2. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.
- F. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101; provide indicator light(s) to report test and diagnostic status.
- G. Accessories:
 1. Provide compatible accessory mounting brackets where indicated or required to complete installation.
 2. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
 3. Provide compatible accessory wire guards where indicated.
 4. Where indicated, provide emergency remote heads that are compatible with the emergency lighting unit they are connected to and suitable for the installed location.

2.04 EXIT SIGNS

- A. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
 1. Number of Faces: Single or double as indicated or as required for the installed location.
 2. Directional Arrows: As indicated or as required for the installed location.
- B. Self-Powered Exit Signs:
 1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
4. Provide low-voltage disconnect to prevent battery damage from deep discharge.
5. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.

2.05 LED DRIVERS

- A. Drivers shall be universal voltage (120-277 volt) or shall be 208 volt, 240 volt, or 480 volt to meet project conditions.
- B. Drivers shall be provided with protection against transients line surge.
- C. Drivers shall be equipped with a quick disconnect.
- D. Power factor shall be greater than or equal to 0.90.
- E. Harmonic distortion shall not exceed the limits set forth in IEEE Standard 519-1992, harmonic limits.
- F. Ambient temperature range shall be -30 degrees F to 104 degrees F.
- G. All drivers shall be UL listed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- 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.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Coordinate locations of outlet boxes as required for installation of luminaires provided under this section.
- B. Install products according to manufacturer's instructions.
- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).
- D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

-
- E. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.
 - F. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 and 502.
 - G. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
 - H. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.
 - I. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
 - J. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.
 - K. Install wall mounted luminaires at height as indicated on Drawings. Coordinate exact mounting heights with Architectural Drawings.
 - L. Install accessories furnished with each luminaire.
 - M. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.
 - N. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
 - O. Bond products and metal accessories to branch circuit equipment grounding conductor.
 - P. Attach all surface mounted fixtures to ceiling or wall surface with a minimum of two attachment points besides the outlet box.
 - Q. Install recessed plaster frames, or other special frames where required for construction type. Install frames securely to provide adequate light fixture support.
 - R. Insure that luminaires requiring access to ballasts or junction boxes have adequate openings and clearances.
 - S. Maintain required clearances between insulation and light fixtures where light fixtures are installed in an insulated ceiling. Provide barriers as needed to prevent insulation from contacting light fixture.
 - T. Provide adequate backing and support from the structural system for all pendent supported fixtures.
 - U. Emergency Lighting Units:
 - 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.
 - V. 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.

3.04 FIELD QUALITY CONTROL

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.

- C. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
- D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.
- E. Examine drawings and site conditions for ceiling construction, structural depths, piping and ductwork locations, door heights, upper cabinet heights and location, and other building elements. Coordinate to avoid conflict with luminaire installation.

3.05 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. 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.
- D. Aim and adjust fixtures as directed.

3.06 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.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage.

3.07 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.
- B. Just prior to Substantial Completion, replace all lamps that have failed.
- C. See Section 01 7000 -Execution and Closeout Requirements for additional requirements.

3.08 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

3.09 SCHEDULE - SEE DRAWINGS

END OF SECTION

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SECTION 271005
TELECOMMUNICATIONS CABLING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Communications system design requirements.
- B. Copper cable and terminations.
- C. Communications identification.
- D. Cabling and pathways inside building(s).
- E. Distribution frames, cross-connection equipment, enclosures, and outlets.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes bonding jumpers for bonding of communications systems and electrical system grounding.
- B. Section 260533.13 - Conduit for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.
- D. Section 262726 - Wiring Devices.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; Electronic Industries Alliance/Electrical Components Association; Revision E, 2005.
- C. ICEA S-83-596 - Indoor Optical Fiber Cables; Insulated Cable Engineers Association; 2011 (ANSI/ICEA S-83-596).
- D. CEA-310 - Cabinets, Racks, Panels, and Associated Equipment; Consumer Electronics Association; Revision E, 2005.
- E. ICEA S-90-661 - Category 3, 5, & 5e Individually Unshielded Twisted Pair Indoor Cables (With or Without An Overall Shield) For Use in General Purpose and LAN Communications Wiring Systems Technical Requirements; Insulated Cable Engineers Association; 2012. (ANSI/ICEA S-90-661)
- F. NECA/BICSI 568 - Standard for Installing Building Telecommunications Cabling; National Electrical Contractors Association; 2006. (ANSI/NECA/BICSI 568)
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. TIA-526-14 - OFSTP-14 - Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant; Telecommunications Industry Association; Rev B, 2010.
- I. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2015

- J. TIA-568-C.2 - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cabling Components; Telecommunications Industry Association; Rev C, 2009.
- K. TIA-568-C.3 - Optical Fiber Cabling Components Standard; Telecommunications Industry Association; 2008 (with Addenda; 2011).
- L. TIA/EIA-568-B.3 - Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling Components Standard, and Addendum 1 - Additional Transmission Performance Specifications for 50/125 um Optical Fiber Cables; Rev B, 2000; Addendum 1.
- M. TIA-569-C - Telecommunications Pathways and Spaces; Telecommunications Industry Association; Rev C, 2012 (with Addenda; 2013).
- N. TIA-598-C - Optical Fiber Cable Color Coding; Telecommunications Industry Association; Rev C, 2005.
- O. TIA-606-B - Administration Standard for the Telecommunications Infrastructure; Telecommunications Industry Association; Rev B, 2012.
- P. TIA-607-B - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; Telecommunications Industry Association; Rev B, 2012 (with Addenda; 2013).
- Q. ANSI/J-STD-607 - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications; Rev A, 2002.
- R. UL 497 - Standard for Protectors for Paired-Conductor Communications Circuits; Current Edition, Including All Revisions.
- S. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.04 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 the contract documents. Obtain direction before proceeding with work.
- B. Arrange for Communications Service Provider to provide service.
- C. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Communications Service Provider representative.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
 - 1. Storage and handling requirements and recommendations.
 - 2. Installation methods.

-
- C. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
 - 1. Provide in writing as part of the Shop Drawing Submittal that the selected wiring and device Manufacturers system Warranty meets the requirements of Paragraph 1.08 Warranty.
 - 2. Provide floorplan drawings showing suggested routing of cabling to the furthest telecommunications jack from the assigned termination rack to confirm telecommunications outlets and associated devices with telecommunications cabling connections are within rated distances of the assigned MDF/IDF Rooms. If cabling distances exceed the recommended manufacturer distances the bidder shall provide written notice to the Engineer for clarification in the shop drawing submittals.
 - 3. Confirm drawings show sufficient quantity and size of cable pathways and cable tray. Note any required revisions to pathway sizes or routing in the shop drawing submittal floorplan drawings.
 - D. Manufacturer Qualifications.
 - E. Evidence of qualifications for installer(s).
 - F. Field Test Reports.
 - G. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
 - 1. Record actual locations of outlet boxes and distribution frames.
 - 2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
 - 3. Identify distribution frames and equipment rooms by room number on contract drawings.
 - H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.
- 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.
 - 3. Employing experienced technicians for all work; show at least 3 years experience in the installation of the type of system specified, with evidence from at least 2 projects that have been in use for at least 18 months; submit project name, address, and written certification by user.
 - 4. The entire installation of the telecommunications system as specified in this section of the specifications shall be completed by an acceptable systems installer. The acceptable systems installers shall meet the following criteria.

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- a. The following installers have been reviewed for their performance and are acceptable installers for this project:
 - 1) ABT Data Technologies, Inc.
 - 2) All State Communications
 - 3) MDI Communications
 - 4) Network Cabling Services, Inc.
 - 5) RBB Electric, Inc.
 - b. All other installers requesting approval to bid this project must submit the following information for evaluation in accordance with Section 26 50 00 and the General Conditions:
 - 1) General Company Information.
 - 2) RCDD Certificate for person preparing and approving the installation. The RCDD is required to be employed by the installing contractor.
 - 3) List of projects, with description of work performed in the last five years. Project list shall include cost of communications system, Owner's representative, address and telephone number.
 - c. Final approval of acceptable installers will be at the discretion of the Architect/Engineer and the Owner.

C. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep stored products clean and dry.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a 1 year period after Date of Substantial Completion.
- C. Manufacturer shall warranty and provide maintenance service for 15 years minimum on the network system.

PART 2 PRODUCTS

2.01 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 (cabling) and TIA-569 (pathways), latest editions (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.

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- B. System Description:
 - 1. Building Entrance Cabling: existing.
 - 2. Horizontal Cabling: Copper.
 - C. 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.
 - 2. Capacity: As required to terminate all cables required by design criteria plus minimum 25 percent spare space.
 - D. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.02 PATHWAYS

- A. Conduit: As specified in Section 260533.13; provide pull cords in all conduit.
- B. Outlets
 - 1. As specified in Section 26 05 33.16 - Boxes.
- C. Underground Service Entrance: Rigid polyvinyl chloride (PVC) conduit, Schedule 40.

2.03 COPPER CABLE AND TERMINATIONS

- A. Copper Backbone Cable: TIA/EIA-568 Category 3 solid conductor unshielded twisted pair (UTP), 24 AWG, 100 ohm; 50 pairs formed into 25-pair binder groups; covered with gray thermoplastic jacket and complying with all relevant parts of and addenda to latest editions of TIA/EIA-568 and ICEA S-90-661, and UL 444.
 - 1. NFPA 70 type CMP plenum-rated cable.
 - 2. Provide cable having conductors twisted at minimum rate of two per foot; actual length and frequency of twists at manufacturer's option.
 - 3. Color code conductors in accordance with ICEA S-90-661.
- B. Copper Horizontal Cable: TIA/EIA-568 Category 6 solid conductor unshielded twisted pair (UTP), 24 AWG, 100 ohm; 250 Mhz, 4 individually twisted pairs; covered with blue jacket and complying with all relevant parts of and addenda to latest edition of TIA/EIA-568 and UL 444.
 - 1. Manufacturer: General Genspeed GS6, Commscope 6504+ or Berk-Tek LANmark-6 Series or equal by Approved Manufacturer.
 - a. General Genspeed GS6 Series.
 - 2. Plenum rated cable, NFPA 70 type CMP.
- C. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool.
- D. Jacks and Connectors: Category 6, 8 position, 8 wire, 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: 4-pair, pre-wired to T568B configuration.
 - 3. Connector modules shall be Panduit CJ688TG.

- 4. Jack Colors:
 - a. All Applications: Provide blue colored jack.

E. Faceplates:

- 1. Modular faceplates shall be Panduit Mini-Com Series faceplates.
- 2. Stainless Steel plates with label ID windows.
- 3. See Drawings for quantity of connector modules and modular faceplates.
- 4. Provide with color coordinated screw cover and clear station and port label covers.
- 5. Provide blank inserts for unused ports.

2.04 GROUNDING AND BONDING COMPONENTS

- A. Comply with TIA-607.
- B. Comply with Section 260526.

2.05 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606.
- B. Comply with Section 260553.

2.06 SOURCE QUALITY CONTROL

- A. Factory test cables according to TIA-568.

2.07 CROSS-CONNECTION EQUIPMENT

- A. Connector Blocks for Category 3 Cabling: Wall mounted, Type 110 insulation displacement connectors; capacity sufficient for cables to be terminated plus 25 percent spare.
- B. Patch Panels for Copper Cabling: Sized to fit EIA standard 19 inch wide equipment racks; 0.09 inch thick aluminum; cabling terminated on modular connectors.
- C. Patch Panels for Copper Cabling: Sized to fit EIA standard 19 inch wide equipment racks; 16 gauge steel with black powdercoat finish; cabling terminated on modular connectors.
 - 1. 48 port, all metal construction, modular patch panel frames, populated with Category 6 jack connectors, by approved equipment manufacturer.
 - 2. Jacks: Non-keyed RJ-45, suitable for and complying with same standard as cable to be terminated and with same manufacturer as used at the data outlet; maximum 48 ports per standard width panel.
 - 3. Capacity: Provide ports sufficient for cables to be terminated plus 25 percent spare.
 - 4. Labels: Factory installed laminated plastic nameplates above each port, numbered consecutively; comply with TIA/EIA-606 using encoded identifiers.
 - 5. Provide incoming cable strain relief and routing guides on back of panel.
 - 6. Manufacturers:
 - a. Panduit CPP Series.
 - b. Approved Equal.

2.08 ENCLOSURES

- A. Backboards: Interior grade plywood without voids, 3/4 inch thick; UL-labeled fire-retardant.
 - 1. Size: 48 inches wide by 96 inches high or as noted on the drawings.
 - 2. Do not paint over UL label.

-
3. Install on all walls in MDF and IDF Rooms from floor to 8'AFF unless noted otherwise on the drawings.
- B. Equipment Racks and Cabinets: CEA-310 standard 19 inch wide component racks.
1. Wall Mounted Cabinets: Swing out double hinged cabinet body, standard adjustable 19" EIA threaded equipment rails, drilled and tapped #12/24 universal mounting holes, vented cabinet body, solid steel locking front door, 300 lb load rating, ak
 - a. Manufacturer: Equal to Chatsworth Cube IT Series or Approved Equal.
 - b. Depth: 24 inches.
 - c. Height: 48 inches.
 - d. Cable Management: Provide horizontal cable management below each patch panel, Panduit Patchlink Series, shallow depth, 1 RU, 2.7 inch depth.
 - e. Provide UL listed horizontal power strip, single input, 120V single phase, 20 amp rated, (8) NEMA 5-20R outlets and an integral circuit breaker and 10 foot cord with NEMA 5-20P plug equal to Chatsworth 12816 Series in IDF Racks.
 - f. Door: solid front door with key lock, Chatworth Key CH751.
 - g. Construction: steel with powdercoat white finish.
- C. Outlet Boxes: For flush mounting in walls; depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius. See section 26 05 37 for additional information and installation requirements.
1. Size, Unless Otherwise Indicated: 4-11/16 inches square by 2-1/8 inches deep.
 2. Wall-Mounted Telephones: 4 inches high by 2 inches wide by 2-1/8 inches deep.
 3. Faceplates: Type 302 stainless steel, complying with system design standards and UL 514C.
 4. Labels: Comply with TIA/EIA-606 using encoded identifiers; label each jack on the face plate as to its function with a unique numerical identifier.

2.09 PENETRATIONS

- A. Cable Sleeves
1. For fire or smoke wall penetrations provide Hilti CP 653 Speed Sleeve or approved Equal
 2. Provide cable sleeves at all up to 2 hour fire rated wall penetrations.
 3. Provide quantity and size (either 2 inch or 4 inch) of sleeves as required for 60% maximum fill of the quantity of cables being installed.
 4. For non-fire rated partitions, provide conduit sleeves through the partitions providing quantity and size of conduits as required for 60% maximum fill of the quantity of cables being installed.
- B. See Section 26 05 33.13 for additional requirements.

2.10 CABLE SUPPORT HANGERS

- A. Manufacturers:
1. Panduit J-Pro Series J-hook.
 2. CADDY CAT HP Series J-hook.
 3. CADDY CAT 425 Series adjustable strap hanger.
 4. Approved Equal.

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- a. Panduit JP2 Series j-hook shall be used for up to 46 Category 6 4-pair communications cables, 30 Category 6A cables.
 - b. Panduit JP4 Series j-hook shall be used for up to 180 Category 6 cables or 115 Category 6A cables.
 - c. Caddy CAT 425 Series adjustable cable support for up to 325 Category 6 cables, or 210 Category 6A cables.
 - d. Manufacturer guidelines shall be used for supporting/mounting the cable supports. Provide wall mount, ceiling mount, threaded rod clip, beam clamp, etc. mounting option as appropriate for the installation
 - e. Cable shall be supported at no greater than four-foot intervals for Category 6 cable. Provide a cable tie at each J-hook to retain and manage the cable bundle.
 - f. J-hooks or adjustable cable supports. to be UL listed as suitable for air handling plenum spaces.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Comply with latest editions and addenda of TIA-568 (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), NECA/BICSI 568, NFPA 70, and SYSTEM DESIGN as specified in PART 2.
- B. See Section 26 0534 Conduit for Telecommunications raceway installation requirements.
- C. See Section 26 0526 Grounding and Bonding for Electrical Systems for Telecommunications systems grounding and bonding requirements.
- D. Comply with Communication Service Provider requirements.
- E. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.
- F. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in this section and Section 26 05 33.13.

3.02 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.
 - 5. Arrange conduit to provide no more than the equivalent of two 90 degree bend(s) between pull points.
 - 6. Conduit Bends: Inside radius not less than 10 times conduit internal diameter.
 - 7. Arrange conduit to provide no more than 100 feet between pull points.
 - 8. Do not use conduit bodies.
- B. Conduit:
 - 1. All penetrations through fire barrier walls or floors shall consist of a conduit sleeve and shall be sealed with an industry approved fire barrier caulk or compound reamed and

bushed. All vertical/horizontal sleeves shall be sized according to station count passing through each. Sized for maximum 60 percent fill.

2. Install conduit from outlet to a location adjacent to the cable supports above the nearest accessible ceiling. Terminate conduit using an insulated bushing.

3.03 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.
5. Install cable support hooks a maximum of 4'-0" on center above ceiling.
6. Where cable tray is installed, run telecommunications cabling in cable tray.
7. Where telecommunication cables are run exposed above accessible ceilings, support the cables to keep them from resting on ceiling tiles. Use properly sized Cable Caddies or J-Hooks on walls above the ceilings to neatly route cables between outlet and termination locations. Minimum distance between supports is 4 feet or in accordance with EIA/TIA standards, whichever is less.

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 6 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. Bridged taps/splices are not allowed as part of the horizontal wiring system.
4. Avoid routing cables near EMI sources.
5. All cabling shall consist of 4 pairs and 1 cable per jack.
6. Install modular outlets at all locations shown on the Drawings. Terminate wiring at workstation jacks and rack.
7. Install cable from all workstation outlets to rack.
8. Each workstation jack shall be provided with its own UTP cable continuous (without splice) from jack to rack.
9. Telecommunications wiring shall be used for both voice and data wiring.
10. Where indicated, workstation jacks may be ganged under a common wall plate.

D. Identification:

1. Use wire and cable markers to identify cables at each end.

E. Field-Installed Labels: Comply with TIA/EIA-606 using encoded identifiers.

1. Cables: Install color coded labels on both ends.

2. Outlets: Label each jack on its face plate as to its type and function, with a unique numerical identifier.
3. Patch Panels: Label each jack as to its type and function, with a unique numerical identifier.
4. All horizontal cabling shall be labeled with permanent tag indication from which jack the cable originated.
5. Machine labels shall be installed on each workstation jack faceplate.
6. All labels shall be a machine label in conformance with ANSI/EIA/TIA 606.
7. Numbering of workstation jacks shall be consistent.
8. Labeling to be verified with Engineer and Owner.
9. Final room numbers to be used for labeling, room numbers on plans are not to be used.

3.04 FIELD QUALITY CONTROL

- A. Comply with inspection and testing requirements of specified installation standards.
- B. 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.
- C. 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 3 Backbone: Perform attenuation test.
 5. Category 3 Links: Test each pair for short circuit continuity, short to ground, crosses, reversed polarity, operational and ring-back, and dial tone.
 6. Category 6 Links: Perform tests for wire map, length, insertion loss, NEXT, PSNEXT, ELFNEXT, PSELFEXT, return loss, delay skew and propagation delay.
 - a. Utilize a Level III/Level IV rated tester compatible with the following test standards:
 - 1) TIA-1152 Level IIIe and ISO/IEC 61935-1 Level IV accuracy.
 - 2) TIA-58-C.2, TIA1152 Category 5, 5e, 6, 6A, and ISO/IEC 11801.
 - b. The cabling tester shall be approved for use with the selected connectivity solution for both Channel and Permanent Link tests, and for the associated warranty provided by the connectivity Manufacturers.
 - c. The company/individual testing the cable shall be manufacturer certified for products provided.
 - d. Contractor shall perform and document all conductor tests per TIA-568-B and ANSI/TIA-606. Return one copy of testing report to the Engineer and one copy to the Owner. All copper station runs must be tested after final installation and termination. All cable runs shall be documented with a hard copy printout of the test results. This printout shall be bound and delivered to the Owner prior to final payment

- D. 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

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**SECTION 274133
TELEVISION SYSTEMS CABLING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Television distribution equipment.
- B. Cable and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260533.13 - Conduit for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SYSTEM DESCRIPTION

- A. Service entrance from local cable utility.
- B. Premises wiring for broadband distribution of television signal, including individual outlets.
- C. Provide a broadband television distribution system as described herein. The system shall support the distribution of broadband signals from various sources including but not limited to programming from local cable provider, city offices, satellite receivers as well as programming generated locally.
- D. The contractor shall provide all necessary amplifiers, cables, connectors and hardware for a complete and functional broadband television distribution system.
- E. Signal at each outlet: 3 dBmV across 75 ohms, minimum, plus 5 dB, minus 0 dB.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate electrical characteristics and connection requirements. Show installation details, cable routing, and system configuration.
- C. Product Data: Provide showing electrical characteristics and connection requirements for each component.
- 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, installation, and starting of product.
- E. Project Record Documents: Record actual locations of outlets, devices, and cable routing.
- F. Maintenance Data: Basic trouble-shooting procedures.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience with service facilities within 100 miles of Project.
- B. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum three years documented experience.
- C. Products: Listed, classified and labeled as suitable for the purpose intended.

1.07 MAINTENANCE SERVICE

- A. Furnish service and maintenance of television system for one year from Date of Substantial Completion.

PART 2 PRODUCTS**2.01 ACCESSORIES**

- A. Splitter:
 - 1. Blonder Tongue SXRS series.
 - 2. Frequency Response: 5 - 1000 MHZ.
 - 3. Isolation: 21 dB minimum.
 - 4. Return Loss: 16 dB minimum.
 - 5. Insertion Loss: 6.8 dB maximum.
 - 6. RFI shielding: 120 dB minimum.
 - 7. Quantity as required for Television locations as shown on Drawings. Provide a cable from each outlets to the racks as indicated on the drawings.
- B. Receptacles:
 - 1. Manufacturer: Panduit CMFSR series.
 - 2. Mini-com self-terminating F connector.
 - 3. Provide with matching Panduit Mini-Com faceplate, color to match devices specified in Section 27 1005.
- C. Branch Distribution Cable:
 - 1. Description: RG 6/F. Plenum rated, copper clad steel center conductor, 90% aluminum braid and 100% foil shield.
 - 2. Product: Comm/Scope or equal by Belden, West Penn.
- D. Conduit
 - 1. As specified in Section 26 0534 - Conduit.
 - 2. Size: Minimum 3/4 inch with larger sizes where noted on Drawings.
- E. Outlets
 - 1. As specified in Section 26 0537- Boxes.
 - 2. Four-inch square box with single gang plaster ring.

PART 3 EXECUTION**3.01 INSTALLATION**

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

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TELEVISION SYSTEMS
CABLING

-
- B. Connect cable television service in accordance with cable utility instructions.
 - C. Provide proper grounding of television system components and wiring. Bond outdoor components to lightning protection system.
 - D. Provide raceway system or utilize cable tray system for all cable.
 - E. Provide cable continuous from the outlets to the data rack locations. Provide a trunk cable from the incoming terminal board to each data rack location as shown on the drawings.
 - F. System connections will be made to provide the features described and specified herein.
 - G. Additional connections and cabling may be required to provide a complete system.
 - H. System connections will be made to provide the features described and specified herein. Additional connections and cabling may be required to provide a complete system.
 - I. Cabling terminated at each piece of equipment shall be cut to length and terminated with the appropriate connector. The use of tie wraps is necessary to maintain the cabling in a neat manner.
 - J. Equipment utilizing screw terminals shall have the conductors tinned prior to tightening into the terminals.
 - K. Cable should be run in one piece without splices made. In the event a splice is absolutely necessary it shall be done to provide proper impedance. Video cable shall use a female to female BNC type barrel with crimped BNC connectors on each end. Splices must be accessible and not internal to conduit as per code regulations
 - L. All National, State and Local Electrical, Fire and Building Codes apply to this project. The contractor must be aware of and adhere to these codes. The Owner shall not be liable for failure of the contractor in the following code. Any portion of the installation that does not meet code shall be removed and re-installed up to code shall be removed and re-installed up to code by the contractor at their own expense.
 - M. All cables and T.V. outlet plates shall be labeled by number or origination and termination designation. Labels must be permanent and legible. Peel off numbers is not acceptable unless clear heat shrink is used over the numbers.
 - N. All cables and T.V. outlet plates shall be labeled by number or origination and termination designation. Labels must be permanent and legible. Peel off numbers is not acceptable unless clear heat shrink is used over the numbers.

3.02 MANUFACTURER'S FIELD SERVICES

- A. Provide services of manufacturer's technical representative to prepare and start systems and supervise final adjustments and tuning of system.

3.03 ADJUSTING

- A. Adjust work under supervision of manufacturer's field service personnel.
- B. Adjust amplifier gain and make other system adjustments to achieve specified output levels at each outlet.

3.04 DEMONSTRATION

- A. Conduct walking tour of Project and briefly describe function, operation, and maintenance of each component.
- B. Include demonstration of color television operation specified signal level at two outlets selected by Owner.

END OF SECTION

SECTION 281300
ACCESS CONTROL AND SECURITY SYSTEM

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Furnish and install a complete Keyscan Aurora access control system. Include software licenses, proximity readers, door sensors, power supplies, control panels, cabling and other such products, equipment and wiring normally required for a complete and operational system.
- B. Where components of the access control and security system are not definitely or correctly specified and are required for the intended service, such omission, error, or other discrepancy should be immediately directed to the Engineer for clarification. Otherwise furnish such items in the type and quantity established by this Specification for the appropriate service intended.
- C. Equipment noted in this section as "Provided by Owner" will be furnished and installed by the Owner. This division is responsible to install software or make connections to Owner provided equipment as specified.

1.02 SYSTEM DESCRIPTION

- A. Access control and security system:
 - 1. Access control and security system activities and functions shall be managed, controlled, and monitored from an existing access control system server connected to the Owner's data network. Coordinate connections to network with Owner.
 - 2. Access control system "real-time" activities shall be capable of being monitored from the access control server or any of the monitoring workstation. The workstations shall be capable of performing all system functions EXCEPT system programming and programming changes.
 - 3. Forced door, door hold, and emergency exit alarm activities detected by the controllers, in any area of the building, shall be immediately reported to the access control system server and displayed on the server monitor and any of the access control workstations as a priority alarm.
 - 4. Card readers, electric door strikes, electric latch retraction exit devices, door position switches, request to exit sensors, and door alarms shall be controlled and monitored through the access control and door monitoring system door controllers.
 - 5. Each card reader shall be connected directly to the door controller in a star configuration. The door controllers are to be connected to the Owner's Data Network system.
 - 6. All door position switches shall be monitored through the access control system. Door position switches shall be given individual addresses and identities. Double doors may be given a single address.
 - 7. All electric door locking and unlocking functions, controlled from the access control and door monitoring system server and workstations, shall be performed through the access control and door monitoring system controllers at pre-programmed times as determined by The Owner, or manually by authorized security personnel.
 - 8. Access cards or fobs shall be used to enter doors equipped with card readers and electric door locks for the purpose of releasing electric door strikes, electric latch retraction exit

devices, and shunting (disarming) door position switches monitored by the access control and door monitoring system.

9. Access card use and door activity shall be capable of being displayed on the access control and door monitoring system monitoring server and workstations.
10. Power supplies for access control and door monitoring system door controllers shall be connected to a 120 volt AC power circuit.
11. Electric door strikes, magnetic locks and electric latch retraction exit device power supplies shall be connected to a 120 volt AC power circuit. Power supplies shall be furnished by Division 08 and installed by the electrical contractor.

1.03 SUBMITTALS

- A. Submit in accordance with the provisions of Section 01 3000 and 26 0500.
- B. Access control and door monitoring system components:
 1. Upon submittal of Shop Drawings, Contractor shall submit required number of copies of a detailed electronic security components schedule.
 2. Itemize components in the sequence and format established by this Specification.
 3. Product literature for each system component.
- C. Description of interface with Division 08 system components.
- D. Description of interface with Division 26 systems.
- E. Documentation certifying that Contractor is a manufacturers' authorized distributor of the proposed system.
- F. Floor plan drawings in AutoCAD 2020 or later format that show all devices and all required wiring to each device.
- G. One line diagrams that show how each device is to be connected to the interface controllers and control panels.

1.04 QUALITY ASSURANCE

- A. Qualifications:
 1. Shall be a manufacturers authorized distributor of the systems proposed and employ competent personnel for system design and installation of systems specified
 2. Shall employ service technicians with manufacturers' certified training to perform testing, inspection, maintenance and repair of systems specified.
 3. Shall demonstrate the satisfactory installation and performance of similar systems installed by the Contractor within the past two (2) years.
- B. Acceptable suppliers:
 1. Electro Watchman, Inc., 4715 19th St SE, Mandan, ND, (701) 258-6169.
 2. Newvision, 1313 Republic St. Bismarck, ND, (701) 222-8888.
- C. Other installers shall submit qualifications for approval as listed above.

PART 2 PRODUCTS

2.01 ACCESS CONTROL AND DOOR MONITORING SYSTEM SOFTWARE

- A. Manufacturer: Keyscan Aurora Series. No Substitutions.

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ACCESS CONTROL AND
SECURITY SYSTEM

2.02 ACCESS CONTROL AND DOOR MONITORING SYSTEM MONITORING SERVER AND WORKSTATION

- A. Existing server. Provide additional licensing as required, coordinate installation on server with Owner.

2.03 ACCESS CONTROL AND DOOR MONITORING SYSTEM DOOR CONTROLLERS

- A. Access control and door monitoring system door controllers shall at a minimum have the following features and capabilities:
 - 1. Support at a minimum, the number of supervised alarm inputs and outputs described in the Specification
 - 2. Provide stand-alone processing of all card reader and door monitoring functions for an indefinite period of time without support from the access control and door monitoring system server.
 - 3. Retain all on-board flash memory for 80 hours in the event of AC power failure
 - 4. Support up to 2 card readers in a star configuration
 - 5. Be contained in a key lockable cabinet mounted as shown on the drawings.

2.04 POWER SUPPLY

- A. Provide low voltage power supply with battery backup for card access system control cabinets. Power supplies shall be filtered and regulated, with minimum 8 hour backup.
- B. Provide with relay contacts for loss of power and trouble conduits.

2.05 NETWORK SWITCH

- A. Manufacturer: Lantronix SM8TATA2SA with (2) TN-GLC-LH-SM SFP fiber modules. Include (2) three meter SC- LC single mode fiber patch cables for interconnections to Owner's network.

2.06 CARD READER

- A. Manufacturer: Dormakaba Model K-PROX3 Series.
 - 1. Indoor/Outdoor IP65 rated.
 - 2. Universal proximity credential compatibility.
 - 3. Wiegand output.
 - 4. Transmitting frequencies: 125 kHz.
 - 5. Standard or mullion mount as indicated on the drawings.

2.07 ACCESS CREDENTIAL

- A. Acceptable manufacturers and respective type:
 - 1. Keyscan 36 bit, 125 kHz, C15001 format, card credential.
 - 2. Quantity: 100.
 - 3. Coordinate with owner for required card range prior to ordering credentials.

2.08 COPPER CABLE AND WIRE

- A. Acceptable manufacturers and respective type:
 - 1. All cable and wire shall comply with the material recommended by the systems manufacturers or as required by National Fire Protection Association Codes, Uniform Fire Codes, and all other applicable State and local codes.

2. Provide cable requirements to Division 26 Contractor.

2.09 BACKBOXES AND JUNCTION BOXES

- A. Contractor shall provide any special backboxes or junction boxes in quantities and type required to meet performance requirements of Specification and Drawings.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify rough-in locations with equipment supplier's Shop Drawings.
- B. Verify quantity of conductors required from equipment supplier's Shop Drawings.

3.02 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Provide interconnecting conduit and wiring between devices and equipment where indicated. All security wiring to be installed in conduit, use of cable tray not allowed.
- C. Color coding of conductors shall be consistent throughout the system. Affix color code chart at control panel locations. All cables shall be installed from the devices to the control panel. All cables at the control panel to be labeled as to the devices connected and door number.
- D. Conceal all conduits.
- E. Install control panels.
- F. Install all devices specified and provide wiring and connections to the devices at the doors. Provide wiring from the door devices to the control panel and terminations in the control panel.
- G. Provide all 120 volt connections as required for all components.

3.03 INSTALLATION

- A. Install fully operational systems in locations required by Drawings and in compliance with the systems manufacturer's printed instruction and recommendations.
- B. Provide all mountings and brackets necessary to install components in compliance with the systems manufacturer's printed instructions and recommendations.
- C. Install access control and door monitoring system software in compliance with the manufacturer's printed instructions and recommendations. Provide all software programming and setup for a fully functional system. Program the function of each door as instructed by the Owner. Each door will have timing functions and arming times of the day separate from other doors. Program the access control system to engage and disengage the security system as instructed by the Owner.
- D. Coordinate connection of door controllers to Ethernet hubs with The Owner's Information Systems technicians.
- E. Complete all initial system programming including door schedules, card holder data entry and access authorizations.

- F. Make final connections at the access control and door monitoring system controllers to card readers, door position switches, request to exit sensors, door alarms, electric door hardware cabling.
- G. Install access control and door monitoring system controllers and power supplies on wall mounting boards in secured areas and connect 120 volt AC circuit as required.
- H. Install access control and door monitoring system terminal server in data rack in room 081..
- I. Complete connections between access control and door monitoring system controllers and card readers as required. Install card readers as shown on the Drawings or specified.
- J. Complete connections from electric door strikes, electric retraction devices, request to exit equipment and power supplies furnished and installed by Division 08 to the control panel, interface modules, or as required on the Drawings.
- K. Install card readers at locations required by Drawings at a height of 48 inches to center from floor. All wire and cable shall be placed in conduit or be concealed from public sight behind the wall surface. Mount card readers adjacent to the handicap door operator push pads.
- L. Complete installation of equipment and components to coordinate the operation of card readers with electric latch retraction, magnetic locks, electric door strikes, and power door operators so power door operators operate in sequence with door locking devices.
- M. Complete connections to door position switches with access control and door monitoring system controller through conduit, as described in Specification, or as required by Drawings.
- N. Complete connections to exit relays and complete connection with access control and door monitoring system controller through conduit as described in Specification, or as required by Drawings.

3.04 INTERFACE WITH OTHER SECTIONS

- A. Provide the Division 26 Contractor with manufacturer's literature describing installation of all devices and controllers. Include detailed wiring diagrams and cable requirements.
- B. Coordinate all door hardware connections requirements with Division 8.

3.05 TEST AND ADJUSTMENTS

- A. Upon completion of the installation of all components, Contractor shall thoroughly test and adjust the system and systems devices to ensure proper operation.
- B. Where required, appropriate correction and adjustment shall be made.

3.06 TRAINING

- A. Contractor shall provide a minimum of one (1) 4-hour periods of training on operation of the access control and security system and system components for The Owner and designated representatives.
- B. Training shall be provided at The Owner's Facilities.

3.07 AS-BUILT DOCUMENTATION

- A. Submit operation and maintenance data as required by Section 01 7800 Closeout Submittals.

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- B. Contractor shall provide the Owner three (3) complete Operation and Maintenance Manuals assembled in loose leaf binders containing the following.
 - 1. As-built system function block diagrams and field wiring diagrams. Final floor plan drawings with field changes and change orders indicated.
 - 2. Manufacturer's System Operating Manuals
 - 3. Schedule of card readers, control points, monitoring points, and other associated equipment.
 - 4. Recommended maintenance procedures and frequencies.
 - 5. Name, address, and telephone number of the responsible service organization.
 - 6. Provide the manuals at least two (2) weeks prior to the start of training

3.08 FINAL COMPLETION

- A. Contractor shall be available to demonstrate the operation and use of the systems to The Owner's personnel and designated representatives.
- B. Verify the following items before scheduling the system demonstration.
 - 1. System installation is complete.
 - 2. System is fully operational.
- C. Verify the following items before final completion.
 - 1. Training is complete.
 - 2. As-built documentation is complete and provided to the Owner.
 - 3. As built documents have been provided and include a minimum of one (1) copy each in three (3) separate binders of the following:
 - a. Itemized list of each system component by type, manufacturer and model #
 - b. Hardware design Specifications, function descriptions and field wiring connections
 - c. Software descriptions, logic flow diagrams, diagnostic programs/descriptions and programming instructions
 - d. Manufacturers product literature for each system component
 - 4. System Operation Manual designed to serve as both a reference and tutorial guide
- D. Drawings in 1/8" scale of each facility showing location of system devices and wiring layout
- E. Contractor shall place the Owner on system component manufacturers mailing list for documentation on hardware and software up-dates, modifications and changes.

3.09 SYSTEM GUARANTEE

- A. Contractor shall, in conjunction with the systems manufacturers, provide a complete parts and labor warranty for the systems. The warranty period shall commence on the date of substantial completion and shall continue without interruption for a period of one (1) year.
- B. During the warranty period, the Contractor shall provide all materials and labor required to correct any malfunction or failure at no charge to The Owner. This warranty shall cover any system malfunction or failure except those, which are caused by negligence, abuse, or misuse by The Owner.
- C. Provide two (2) years of software support and any software upgrades during that two-year period.

3.10 SERVICE

- A. Contractor shall be able to provide service 24 hours a day, 7 days a week, and respond within four (4) hours on critical problems.
- B. The service shall be performed by service technicians with manufacturer's certified training with respect to the specified systems
- C. Contractor must be able to provide a service maintenance agreement for the entire system upon expiration of the manufacturer's warranty.

END OF SECTION