

PROJECT MANUAL

PROJECT NAME:

Lucas Building ICN CRAC Unit Replacement

PROJECT ADDRESS:

321 E 12th Street
Des Moines, Iowa 50319

PROJECT DATE: May 17th, 2024

-

OWNER:

Iowa Department of Administrative Services
109 Southeast 13th Street
Des Moines, Iowa 50319



OWNER PROJECT NUMBER: 9358.00

OWNER REQUEST FOR BID NUMBER: RFB 935800-01

-

CONSTRUCTION MANAGER:

DCI Group Inc.
220 SE 6th Street Suite 200
Des Moines, Iowa 50309



CONSTRUCTION MANAGER PROJECT NUMBER: 23-049

-

ARCHITECT:

KCL Engineering
300 4th Street
West Des Moines, Iowa 50265

ARCHITECT PROJECT NUMBER: 9338.00

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SECTION 00 0107

SEALS PAGE

I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge.

Discipline: Mechanical and plumbing

Stamp:

Company Name: KCL Engineering

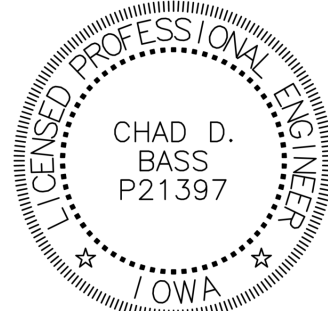
Address: 300 4th St. West Des Moines, IA 50265

Telephone: 515-205-1397

Name: Chad Bass

Responsibility: _____

License#: P21397



Chad Bass

I hereby certify that the portion of this technical submission described below was prepared by me or under my direct supervision and responsible charge.

Discipline: Electrical

Stamp:

Company Name: KCL Engineering

Address: 300 4th St. West Des Moines, IA 50265

Telephone: 515-300-8092

Name: Eric Heynen

Responsibility: _____

License#: P24706



Eric Heynen

END OF SECTION

SECTION 00 0110

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END OF SECTION

SECTION 00 0115

LIST OF DRAWING SHEETS

DRAWINGS

1.01	SHEET	TITLE
A.	00	Cover Sheet
B.	M0	Symbols and General Notes
C.	MD1	Ground Floor Plan HVAC Demo
D.	MD2	Penthouse and Roof HVAC Demo
E.	M1	Ground Floor Plan – HVAC
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G.	ED1	Electrical Demo Plan
H.	E1	Electrical Plan
I.	S1	Structural Notes & Roof Framing Plan
J.	S2	Structural Details

END OF SECTION

SECTION 00 0116

BID SUBMITTAL CHECKLIST

PART 1 - GENERAL

1.01 BID SUBMITTAL CHECKLIST

- A. The Bidder is responsible to see that the bid is submitted online at [IMPACS Electronic Procurement System](#) on or before the due date and time specified. Late bids shall not be accepted.
- B. Bids shall be typewritten or in ink. All information requested shall accompany the bid. All blocks shall be completed. Errors shall be lined out and initialed.
- C. The right is reserved to reject any or all bids. The State may waive minor deficiencies or informalities in the best interest of the State of Iowa.
- D. A properly prepared and submitted bid document is the bidder's responsibility.
- E. Bids cannot be changed after the bid opening.
- F. In all cases, no verbal communications by any party will override written communications from the issuing office.
- G. The Bid Form shall be completed in full and signed and submitted by an officer of the bidder with authority to bind in a contract.
- H. If Bid Bond is called for, it shall accompany the Bid submission.
- I. If Non-discrimination Clause information is called for, it shall accompany the Bid submission.
- J. If Targeted Small Business Pre-bid Contact information is called for, it shall accompany the Bid submission.
- K. If Certificate of Site Visit form is called for, it shall accompany the Bid submission.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 00 1113

NOTICE TO BIDDERS

RFB #935800-01

The Iowa Department of Administrative Services will be receiving bids for the replacement of the ICN CRAC units at the Lucas Building, Des Moines, Iowa 50319.

The Iowa Department of Administrative Services anticipates construction to begin in January 2025 and end in April 2025.

Bids must be received no later than **2:00 pm, Thursday, June, 13th, 2024**. Late bids will not be considered. Bids shall be submitted on [IMPACS Electronic Procurement System](#). The Bid shall be accompanied by a Bid Security as set forth in the Instructions to Bidders in the amount of 5% of the total bid amount. Each bid shall be accompanied by a bid bond, cashier's check or a certified check drawn upon a solvent bank chartered under the laws of the United States of America.

Bid Opening

The time and place of bid opening will be held meet.google.com/pha-tsmw-yai and teleconference number (US)+1 716-298-7118 Pin: 693 879 458# at 3:00 pm, Thursday, June, 13th, 2024

The Iowa Department of Administrative Services reserves the right to reject any and all bids, and to waive irregularities and to accept a bid that is deemed in the best interest of the State of Iowa.

Bidders must comply with all affirmative action/equal employment opportunity provisions of the State of Iowa and the Federal Government.

This project is exempt from Iowa Sales Tax. Davis Bacon Wages **will not** apply to this project.

Questions must be submitted by 2:00 pm, June 7th, 2024, to the Issuing Officer.

Bidding documents may stipulate a specific product. Substitute product will be considered if a written request is received by 2:00 pm, June 7th, 2024, prior to bid opening. Substitution requests will be considered for all products per Section 01 2500 Substitution Procedures, even if the specification does not include a statement such as "or equal," "equal to," "equivalent to," or "basis of design," unless otherwise noted.

An **optional** Pre-Bid meeting will be held on Tuesday June 4th at 10:30 am at the Lucas Building at 321 E 12th Street, Des Moines, Iowa 50319. The meeting will be in the SE corner of the 2nd floor. Please use the front doors and go up the marble stairs east of the elevator lobby up to the 2nd floor. This meeting is not mandatory but is highly recommended.

Bidding Documents, including drawing sheets bearing the project name Lucas Building ICN CRAC Unit Replacement, Dated 5/17/24 and the Project Manual prepared by KCL Engineering 5/17/24, may be obtained from Rapids Reproduction by visiting www.rapidsrepro.com or by calling (515) 251-3222 on Tuesday, May 28th, 2024.

For further information regarding this project contact:

Michael Bradbury – Issuing Officer

Phone: (515) 515-823-9327

E-Mail: construction.procurement@iowa.gov

END OF SECTION

SECTION 00 2113

INSTRUCTIONS TO BIDDERS

RFB #935800-01

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Project Description
- B. Owner
- C. State Agency Representatives and Contacts
- D. Proposal Form and Submissions
- E. Taxes
- F. Alternate Bids
- G. Drawings
- H. Bid Security
- I. Due Date and Time for Receipt of Bids
- J. Commencement and Completion Date
- K. Site Visit
- L. Pre-bid Meeting
- M. Questions
- N. Addenda and Interpretations of the Contract Documents
- O. Substitutions
- P. Obligation of Bidder
- Q. Public Records and Requests for Confidential Treatment
- R. Withdrawal of Bid
- S. Bid Closing
- T. Basis of Bids
- U. Informalities/Rejection of Bids
- V. Consideration of Bids
- W. Preference
- X. Qualifications
- Y. Insurance
- Z. Form of Agreement between Owner and Contractor
- AA. Execution of Contract
- BB. Laws and Regulations
- CC. Contract Documents and Order of Precedence
- DD. Conditions of the Work
- EE. Subcontracts
- FF. Project Manual/Drawings

1.02 PROJECT DESCRIPTION

- A. Project Description: Replacement of the computer room AC units at the Lucas Building.

1.03 OWNER

- A. State of Iowa, Department of Administrative Services, 109 SE 13th St, Des Moines, IA 50319

1.04 STATE AGENCY REPRESENTATIVES AND CONTACTS

- A. PURCHASING AGENT: Michael Bradbury – Issuing Officer, State of Iowa, Department of Administrative Services, Hoover State Office Building, 3rd floor, 1305 East Walnut Street, Des Moines, IA 50319-0105, Phone: 515-823-9327; email: construction.procurement@iowa.gov

- B. OWNER REPRESENTATIVE: Jennifer Kleene, State of Iowa, Department of Administrative Services, 109 SE 13th Street, Des Moines, IA 50319, Phone: 515-725-0454; email: jennifer.kleene@iowa.gov
- C. ON-SITE COORDINATOR: Patrick Kazeze, ICN, Address, Phone: 515-725-4670; email: patrick.kazeze@icn.state.ia.us
- D. CONSTRUCTION MANAGER CONTACT: Travis Hoyle, DCI Group, 220 SE 6th St. Des Moines, IA 50309, Phone: 641-485-7057; email: travish@dcigroup-us.com
- E. DESIGN PROFESSIONAL CONTACT: Chad Bass, KCL Engineering, 300 4th St. West Des Moines, IA, Phone: 515-724-7938; email: cbass@kclengineering.com
- F. COMMISSIONING AGENT CONTACT: Andrew Bennett, System Works LLC, 409 5th St. West Des Moines, IA 50265, Phone: 515-975-8251; email: Andrew.bennett@systemworkslc.com

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 PROPOSAL FORM AND SUBMISSION

- A. A properly prepared and submitted bid is the bidder's responsibility. Bids are to be made in accordance with these Instructions to Bidders and items included on the Bid submission. Failure to comply may be cause for rejection.
- B. The Bid is to consist of the required Bid information, together with the other information specified below to be submitted with the Bid, in which copies are included with these Bidding Documents.
 - 1. The total bid package submitted is required to include the following:
 - a. An online submission including:
 - 1) Required Bid Form (To be uploaded online)
 - 2) Required Non-discrimination Clause Information
 - 3) Required Targeted Small Business Pre-bid Contact Information
 - 4) Bid Security (documentation provided by Bidder) (To be uploaded online) (Required)
 - 5) Certification of Site Visit (To be uploaded online if Pre-Bid is Mandatory)
- C. Include the amount for performing all work described in the drawings and specifications for Base Bid and for each Alternate Bid requested.
- D. Acknowledge receipt of all Addenda issued, where so indicated on the Bid Form
- E. All required information to be submitted, by an officer of the company having authority to bind the company in a contract.
- F. Commencement of the work of the contract shall begin with the Contractor's receipt of a fully executed contract (signed by both parties).
- G. The Owner reserves the right to award a contract for Base Bid only, or for Base Bid in combination with any, or all, identified Alternate Bids. The Owner reserves the right to award a contract for individual Bid Packages, or any combination of Bid Packages. Each Bidder must comply with all of the General Requirements of the project and any requirements of the Project manual that apply to their scope of work.
- H. The company's Federal I.D. Number and the Iowa Contractors Registration Number shall be included in the Bid Form.
- I. Unless indicated otherwise, the Bid shall be for a single responsibility contract for all work as indicated on the Drawings and specified in the Project Manual, and shall be a lump sum amount. If no change in the Base Bid amount is required with respect to consideration of a particular Alternate Bid, enter "No Change" in the blank for that Alternate Bid.
- J. Where so requested, provide Unit Prices for the designated types of work and in the units specified, in which the Unit Prices would be used as adjustments to the quantities described in the instructions as the basis for the Base Bid and any Alternate Bid work. A Unit Price would be applicable in the event the Owner should request additional work of that type beyond the extent

and quantity that has been established as the scope of the work by graphic delineation and notations on the Drawings, or by otherwise stipulating in the Bidding Documents a numerical quantity of the work, for the Bidder's use in determining the lump sum bid amount for the Base Bid and any requested Alternate Bid containing such work. The Unit Prices shall also be used to adjust the Contract Amount for actual quantities of work involved when the work subject to Unit Price adjustment differs by being less in quantity than that contemplated by the original scope of work for the respective Base Bid or Alternate Bid.

- K. Completed State of Iowa Nondiscrimination Clause information and Subcontractor Targeted Small Business Enterprise Pre-Bid Contact Information, included in these Bidding Documents, are to accompany the Bid submission. Bidders shall comply with all affirmative action/equal opportunity provisions of State and Federal laws. The Owner seeks to provide opportunities for Targeted Small Businesses in accordance with the provisions of Chapter 73 of the Code of Iowa.
- L. All Bid information is to be submitted online. Any required Bid Security shall be provided, in the form and amount specified elsewhere in these Instructions to Bidders, at the time of submission of the Bid. When a site visit is mandatory as specified elsewhere in these Instructions to Bidders, and a Certificate of Site Visit is required to be submitted with the Bid as evidence of such visit having occurred for purposes of observing the conditions of the site and the work proposed therein, the Certificate shall be uploaded with the bid submission.

3.02 TAXES

- A. In accordance with Section 423 of the Code of Iowa and 701-19 of the Iowa Administrative Rules, Iowa Construction Sales Tax Exemption Certificates for this project will be issued. Do not include Iowa sales tax or use tax, or any local option sales tax, on construction materials in determining your bid prices. The successful Contractor will be required to notify the Department of Administrative Services project manager of all Subcontractors within forty-eight (48) hours after the published date and time by which bids must be submitted. Information on the Contractor and each Subcontractor shall include the firms' name, address, contact person, federal tax identification number, and the Iowa contractor registration number. For the Contractor and each Subcontractor, designate the type of trade or category of work that is to be provided on the project. The Construction Manager for the Department of Administrative Services must be informed when any Subcontractor is added to the project. Following receipt of the information, the Construction Manager for the Department of Administrative Services will arrange to have an authorization letter and certificate (please see sample, included in the Project Manual) issued on behalf of the Contractor and each Subcontractor and will forward the documents to the Contractor for distribution and use by each in purchasing construction materials for this project. Certificates issued for this project shall be used for tax-exempt purchasing construction materials for this project only.

3.03 ALTERNATE BIDS

- A. Bidders are to bid all Alternates requested on the Bid Form. Alternates quoted will be reviewed and accepted or rejected at the option of the Department of Administrative Services. Accepted Alternates will be identified in the Owner-Contractor agreement. Indicate the price for Alternates described, as shown on the Drawings and specified in the Project Manual, and identify in the correct location on the Bid Form.

3.04 DRAWINGS AND PROJECT MANUAL

- A. Drawings and Project Manual are specified in the Notice to Bidders or any extension thereof made by Addendum.

3.05 BID SECURITY

- A. Each Bid shall be accompanied by Bid Security.
- B. The Bid Security shall be in the form of a Bid Bond, Certified check, or Cashier's check in an amount not less than five percent (5%) of the maximum value of the Bid, including any additive

Alternates. NOTE: Checks other than Certified checks and Cashier's checks will not be accepted. Bonds shall be issued by a bonding company licensed to transact business in the State of Iowa. The Attorney in Fact who signs the Bond shall file with the Bond a certified and effectively dated copy of their Power of Attorney. The Bid Security shall be made payable to the Iowa Department of Administrative Services, and shall accompany the Bid. If a Bid Bond is not used, copies of Certified checks or Cashier's checks must be uploaded and hand delivered, in a sealed envelope, or mailed upon request. The Bid Security shall serve as a guarantee that a Bidder who is offered a contract will enter into an Agreement with the State of Iowa and will file an approved surety company's Performance Bond, Payment Bond and the Insurance Certificates as evidence of the required Insurance prior to execution of the contract. Upon failure to comply, the Bid Security shall be forfeited as liquidated damages. The governmental entity shall retain the bid security furnished by the successful bidder until the approved contract form has been fully executed, a bond has been filed by the bidder guaranteeing the performance of the contract, and the contract and bond have been approved by the governmental entity. The provisions of chapter 573, where applicable, apply to contracts awarded under this chapter. The governmental entity shall promptly return the checks or bidder's bonds of unsuccessful bidders to the bidders once the Notice of Intent to Award is issued.

3.06 DUE DATE AND TIME FOR RECEIPT OF BIDS

- A. Properly completed Bids shall be submitted online through [IMPACS Electronic Procurement System](#), no later than the time and date specified in the Notice to Bidder or any extension thereof made by Addendum. Written, emailed, oral or telephonic Bids are invalid, and will not receive consideration. The Bidder shall assume full responsibility for the timely online submission of the Bid. Late bids will not be accepted.

3.07 COMMENCEMENT AND COMPLETION DATES

- A. Commencement of the Work of the Contract shall be the day of receipt by the selected Contractor of the fully-executed contract. Final completion of the Work of the contract shall be acknowledged as a part of the Contractor's proposal.

3.08 SITE VISIT

- A. A site visit by the prospective bidder is highly recommended at the time of the Pre-Bid Meeting of this project.

3.09 PRE-BID MEETING

- A. Pre-Bid Meeting will be specified in the Notice to Bidders or any extension thereof made by Addendum.

3.010 QUESTIONS

- A. Questions on this project may be raised and discussed at the time of the Pre-Bid Meeting or by submitting in writing to the issuing officer as specified in the Notice to Bidders or any extension thereof made by Addendum.

3.011 ADDENDA AND INTERPRETATIONS OF THE CONTRACT DOCUMENTS

- A. Any person contemplating submitting a proposal for the proposed Contract, who is in doubt as to the true meaning of any part of the Bidding Documents, shall submit a written request for an interpretation thereof. The person submitting a request will be responsible for its prompt delivery. Every request for such interpretation should reference the Bid Number specified in the Bidding Documents, and shall be made in writing (email preferred). Questions shall be submitted to the previously identified Purchasing Agent for the Department of Administrative Services. To be given consideration, requests shall be received as specified in the Notice to Bidders or any

extension thereof made by Addendum. Replies, which revise or correct the Bidding Documents, or provide necessary clarifications, will be issued in the form of a written Addendum to the Bidding Documents. Interpretations, corrections or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections, or changes. The Bidder is to include any resultant cost changes in the Bid Sum. Addenda will be posted electronically at the respective bid site where the bid is initially posted. Acknowledgment by the Bidder of each issued Addendum shall be noted in the location so indicated on the Bid. All Addenda issued shall become part of the Contract Documents.

3.012 SUBSTITUTIONS

- A. Where the Bidding Documents stipulate a specific product be provided by naming one or more manufacturer and model, a substitute product will be considered when a written request is received as specified in the Notice to Bidders or any extension thereof made by Addendum prior to bid opening. Substitution requests will be considered for all products per Section 01 2500 Substitution Procedures, even if the specification does not include a statement such as “or equal,” “equal to,” “equivalent to,” or “basis of design,” unless otherwise noted. Substitution requests shall be emailed to the Issuing Officer at the email address provided in Instructions to Bidders Section 1.04.

3.013 OBLIGATION OF BIDDER

- A. It shall be the responsibility of each Bidder contemplating the submission of a Bid for the proposed Contract to fully acquaint himself/herself with conditions at the work site, project requirements, and to become acquainted thoroughly with the work, and all conditions that may be related to it. No considerations or revision in the contract price or scope of the project will be considered by the Owner for any item that could have been revealed by a thorough on-site inspection and examination.
- B. By submission of a Bid, it shall be understood that the Bidder assures that he/she has reviewed and is thoroughly familiar with the project requirements, contract conditions and supplementary conditions, the drawings, specifications, addenda, and that the bidder is aware of the conditions existing at the site that may relate to the work of this project. Failure of any Bidder to examine any form, document, or other instrument shall in no way relieve the Bidder from any obligation in respect to his/her Bid.

3.014 PUBLIC RECORDS AND REQUESTS FOR CONFIDENTIAL TREATMENT

- A. The Agency's release of public records is governed by Iowa Code chapter 22. Contractors are encouraged to familiarize themselves with Chapter 22 before submitting a Proposal. The Agency will copy and produce public records upon request as required to comply with Chapter 22 and will treat all information submitted by a Contractor as non-confidential records unless Contractor requests specific parts of the Proposal be treated as confidential at the time of the submission as set forth herein AND the information is confidential under Iowa or other applicable law.
- B. A Contractor requesting confidential treatment of specific information must: (1) fully complete Form 22 (Available at <https://das.iowa.gov/sites/default/files/procurement/pdf/Form%2022-ConfidentialityRequest-RFB.pdf>), (2) identify the request in the transmittal letter with the Contractor's Proposal, (3) conspicuously mark the outside of its Proposal as containing confidential information, (4) mark each page upon which confidential information appears, and (5) submit a “Public Copy” from which the confidential information has been excised.
- C. Form 22 will not be considered fully complete unless, for each confidentiality request, the Contractor: (1) enumerates the specific grounds in Iowa Code chapter 22 or other applicable law that supports treatment of the material as confidential, (2) justifies why the material should be maintained in confidence, (3) explains why disclosure of the material would not be in the best interest of the public, and (4) sets forth the name, address, telephone, and e-mail for the person authorized by Contractor to respond to inquiries by the Agency concerning the confidential status of such material.

- D. The Public Copy from which confidential information has been excised is in addition to the number of copies requested in Section 3 of this RFP. The confidential material must be excised in such a way as to allow the public to determine the general nature of the material removed and to retain as much of the Proposal as possible.
- E. **Failure to request information be treated as confidential as specified herein shall relieve Agency and State personnel from any responsibility for maintaining the information in confidence. Contractors may not request confidential treatment with respect to pricing information and transmittal letters. A contractor's request for confidentiality that does not comply with this section or a contractor's request for confidentiality on information or material that cannot be held in confidence as set forth herein are grounds for rejecting contractor's Proposal as non-responsive. Requests to maintain an entire Proposal as confidential will be rejected as non-responsive.**
- F. If Agency receives a request for information that Contractor has marked as confidential and if a judicial or administrative proceeding is initiated to compel the release of such material, Contractor shall, at its sole expense, appear in such action and defend its request for confidentiality. If Contractor fails to do so, Agency may release the information or material with or without providing advance notice to Contractor and with or without affording Contractor the opportunity to obtain an order restraining its release from a court possessing competent jurisdiction. Additionally, if Contractor fails to comply with the request process set forth herein, if Contractor's request for confidentiality is unreasonable, or if Contractor rescinds its request for confidential treatment, Agency may release such information or material with or without providing advance notice to Contractor and with or without affording Contractor the opportunity to obtain an order restraining its release from a court possessing competent jurisdiction.

3.015 WITHDRAWAL OF BID

- A. A Bid may be modified or withdrawn only before the time and date for receipt of Bids. Said request for modification or withdrawal of a bid must be completed online through [IMPACS Electronic Procurement System](#). A Bid shall remain valid for consideration by the Owner for the following period(s) of time after the date specified for receipt of Bids, or until such time following that period that the apparent low bidder requests in writing that the Bid be withdrawn, after which the Bid may be withdrawn without forfeiture of any required Bid Security. The Bid shall be valid for not less than thirty (30) calendar days after the date Bids are specified to be due. With the approval of the Department of Administrative Services, a bid may be withdrawn after opening, but only if the bidder provides prompt written notification that adequately documents the commission of an honest error that may cause undue financial loss.

3.016 BID OPENING

- A. All bids received on or before the due date and time specified in the Notice to Bidder or any extension thereof made by Addendum will be opened and the name of the Bidder and the amount of their Bid will be announced.

3.017 BASIS OF BIDS

- A. The Bidder shall include all additional documents or appendices that are requested to be submitted concurrent with the Bid submission; failure to comply may be cause for rejection.
- B. In accordance with Iowa law, Section 8A.311: A bidder, to be considered for an award of a state construction contract, shall disclose to the state agency awarding the contract the names of all subcontractors and suppliers who will work on the project being bid, within forty-eight (48) hours after the published date and time by which bids must be submitted. A bidder shall not replace a subcontractor or supplier disclosed without the approval of the state agency awarding the contract.
 - 1. A bidder, prior to an award or who is awarded a state construction contract, shall disclose all of the following, as applicable:
 - a. If a subcontractor or supplier disclosed (under the preceding) by a bidder is replaced, the reason for replacement and the name of the new subcontractor or supplier;

- b. If the cost of work to be done by a subcontractor or supplier is changed or if the replacement of a subcontractor or supplier results in a change in the cost, the amount of the change in cost.
 - c. Any reduction in subcontractor or supplier price as a result of the change, if the change is approved by the Owner, shall be deducted from the Trade Contract via a deductive Change Order. Any such changes, if approved by the Owner, which result in an increase in the Trade Contract Price shall be borne by the Trade Contractor.
- C. The Bidder is specifically advised that any person, firm or other party to whom it is proposed to award a subcontract under this contract must:
 - 1. Be registered in the State of Iowa and have an Iowa Contractor's Registration number, and
 - 2. Be acceptable to the Owner.

3.018 INFORMALITIES/ REJECTION OF BIDS

- A. The Iowa Department of Administrative Services reserves the right to waive any irregularities or informalities and to enter into a Contract with a Bidder, or to reject any or all bids as it deems to be in the best interest of the State, without penalty.

3.019 CONSIDERATION OF BIDS

- A. It is the intent of the Department of Administrative Services to award a Contract to the lowest responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and is determined to be compliant with all Bidding Requirements, and does not exceed the funds available for construction.
- B. Bidder is to bid on each Alternate Bid requested. Failure to do so may result in disqualification of the bid. The Department of Administrative Services reserves the right to accept any, or no, Alternate Bid. Alternate Bids may be considered in any order or combination, and the low successful Bidder will be determined on the basis of the sum of the Base Bid and the Alternate(s) accepted at the time of the Contract award.
- C. In evaluating Bids, any proposal offered by a Bidder for an alternate design, or for materials other than those shown or specified for the Base Bid or for Alternate Bid construction under the proposed Construction Documents or called for by any issued Addenda to those Construction Documents, will not be considered in determining the low successful Bidder. However, the Department of Administrative Services reserves the right to consider any such Bidder-proposed (Contractor's Alternate) alternate designs or materials with the low successful Bidder, after the low successful Bidder is determined in the manner described above (A and B).
- D. Notice of Intent to Award the Bid(s) will be sent to all Respondents submitting a timely Bid and may be posted at the website shown on the RFB cover sheet. Negotiation and execution of the Contract(s) shall be completed no later than fifteen (15) days from the date of the Notice of Intent to Award or such other time as designated by Agency. If the successful Bidder fails to negotiate and deliver an executed Contract, including all required documents such as payment and performance bonds and insurance certificate, by that date, the Agency, in its sole discretion, may cancel the award and award the Contract to the remaining Bidder the Agency believes will provide the best value to the State.

3.020 PREFERENCE

- A. By virtue of statutory authority, a preference shall be given to Iowa domestic labor, products produced and provisions grown within the state of Iowa, in accordance with the provisions of Chapter 73, Code of Iowa and any amendments thereto.
- B. Enforcement of reciprocal resident bidder preference and resident labor force preference codified at Iowa Code Section 73A.21.
 - 1. NOTICE: Failure on the part of the bidder to carefully read the following paragraphs and to provide the information requested below may make the bidder's bid materially nonresponsive and therefore ineligible for contract award. Violations of Iowa Code Section 73A.21 may, among other things, result in civil penalties assessed by the Commissioner of the Division of

Labor of Iowa Workforce Development. The bidder should seek out the advice of an attorney if he or she has questions about Iowa Code Section 73A.21. As a part of the competitive procurement of contracts for Public Improvements that must be awarded to the low bidder (if the bid is responsive and the bidder is deemed responsible), Public Bodies shall allow a preference to Resident Bidders if a Nonresident Bidder places a bid for the contract for the Public Improvement and that Nonresident Bidder's state or foreign country gives resident bidders of that state or foreign country a preference (including a labor force preference or any type of preferential treatment). The preference allowed, or reciprocally applied, shall be equal to the preference given or required by the state or foreign country in which the Nonresident Bidder is a resident bidder.

"Public Body" means the State of Iowa (and its agencies) and any of its political subdivisions, including school districts, public utilities, and the state board of regents.

"Public Improvement" means a building or other construction work to be paid for in whole or in part by the use of funds of the State of Iowa, its agencies, and any of its political subdivisions and includes road construction, reconstruction, and maintenance projects.

"Resident Bidder" means a person or entity authorized to transact business in of the State of Iowa and having a place of business for transacting business within the State of Iowa at which it is conducting and has conducted business for at least three years prior to the date of the first advertisement for the public improvement. Note, however, that if a nonresident bidder's state or foreign country has a more stringent definition of a resident bidder, the more stringent definition is applicable as to bidders from that state or foreign country.

"Nonresident Bidder" means a person or entity who does not meet the definition of a resident bidder.

- C. Nonresident bidders shall be required to certify on the Bid submission, where so indicated, the state or foreign country in which the firm is a resident, and if that state or foreign country uses a percentage for in-state bidders and the amount of the preference.
- D. If it is determined that this may cause denial of federal funds which would otherwise be available, or would otherwise be inconsistent with requirements of federal law, this section shall be suspended, but only to the extent necessary to prevent denial of the funds or to eliminate the inconsistency with federal requirements.

3.021 QUALIFICATIONS

- A. In accordance with Iowa Code 26.9(2) and 26.16, no potential bidder shall be required to provide confidential or proprietary information or meet any class requirements as a precondition to submitting a responsive bid. However, as noted in Iowa Code 26.9(2), the lowest responsive bidder may be required to provide additional information to verify responsibility prior to and as a condition of obtaining final award of the contract. Any qualification requirements contained in any bid document indicates only preferred qualifications, not a precondition to bid, and the lowest responsive bidder's qualifications will be evaluated individually based on all information provided.
- B. The Owner may make such investigations as he or she deems necessary to determine the ability of the awarded Bidder to perform the required work, and the awarded Bidder shall furnish to the Owner all such information and data for this purpose. The Owner reserves the right to rescind any awarded Bid if the evidence submitted by, or in investigation of, such Bidder fails to satisfy the Owner that the Bidder is properly qualified to carry-out the obligations of the Contract and to complete the Work contemplated therein.
- C. Bidders shall be registered as a Construction Contractor with the Labor Commissioner, Iowa Workforce Development Department, as required by Chapter 91C of the Code of Iowa. Bidder's Iowa Contractor Registration Number shall be included in the location provided in the Bid Form.
- D. Non-resident corporations submitting bids must be in compliance with Section 490.1501 of the Code of Iowa and legally authorized thereby to carry-on such business in the State of Iowa as is required by the Contract Documents.
- E. An out-of-state Bidder, if awarded a contract, will be required to submit evidence of authorization to do business in the State of Iowa.

3.022 INSURANCE

- A. Insurance Requirements
 - 1. The Contractor shall maintain in effect, with insurance companies of recognized responsibility, at its expense, insurance covering its work of the type and in amounts required by this Contract. The Contractor's insurance shall, among other things, insure against any loss or damage resulting from the Contractor's performance of this Contract. All such insurance policies shall remain in full force and effect for the entire life of this Contract and shall not be canceled or changed except after thirty (30) days written notice to the Owner.
 - 2. **Amounts of Insurance Required – Refer to ConsensusDOCS 802 (see template in Project Manual)**
- B. Certificates of Coverage
 - 1. Certificates of the insurance described above shall be submitted to the Owner before starting any construction activities and shall be subject to approval by the Owner. The Contractor shall provide certificates for the insurance required. The insurer shall state in the certificate that no cancellation of the insurance will be made without at least thirty (30) days prior written notice to the Contractor. Upon receipt of any notice of cancellation or alteration, Contractor shall within ten (10) days procure other policies of insurance, similar in all respects to the policy or policies, about to be canceled or altered, and, if the Contractor fails to provide, procure, and deliver acceptable policies of insurance, or satisfactory evidence thereof, in accordance with the terms hereof then, at the Owner's option, Owner may obtain such insurance at the cost and expense of Contractor, without the need of any notice to Contractor.
- C. No Limitation of Liability
 - 1. Acceptance of the insurance certificates by the Owner shall not act to relieve the Contractor of any obligation under this Contract. All insurance policies and certificates shall be issued only by companies authorized to transact business in the State of Iowa. It shall be the responsibility of the Contractor to keep the respective insurance policies and coverage's current and in force during the life of this agreement.
 - 2. A Sample Certificate of Insurance is attached for reference following this Section.

3.023 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

- A. The Agreement for the Work will be written on ConsensusDOCS 802 Form of Agreement between Owner and Contractor (sample of the document with modifications incorporated is bound in this Project Manual).

3.024 EXECUTION OF CONTRACT

- A. Contract documents shall mean and include the following:
 - 1. Contract: ConsensusDOCS 802
 - 2. Performance and Payment Bonds
 - 3. Project Manual
 - 4. Drawings
 - 5. Numbered Addenda issued after initial publication of Bid Documents
 - 6. Numbered Modifications (Change Orders) issued after Contract is signed

3.025 LAWS AND REGULATIONS

- A. The Bidder's attention is directed to the fact that all applicable laws and regulations of Federal and State agencies having jurisdiction over the construction of this project shall apply to any contract resulting from this proposal, and it shall be deemed that those rules and regulations are made a part of such contract the same as if set forth in their entirety therein. By submitting a Bid, the Bidder confirms that he/she is familiar with and understands the Contractor's responsibility under all Federal and State of Iowa laws and regulations with respect to the Work described by the proposed Contract Documents.

3.026 CONTRACT DOCUMENTS AND ORDER OF PRECEDENCE

- A. Where an irreconcilable conflict exists among Applicable Legal Requirements, this Contract, the specifications in the Materials and the Drawings, the earliest item mentioned in this sentence involving a conflict shall control over any later mentioned item or items subject to such conflict unless doing so would result in reducing the Bidder's duty of care or obligations under this Contract, in which case the terms resulting in the highest requirements for Bidder performance shall control.

3.027 CONDITIONS OF THE WORK

- A. Each bidder must fully inform him/herself of the conditions under which the work is to be performed at the site of the work, the obstacles which may be encountered, and all other relevant matters concerning the work to be performed. Failure to do so will not relieve a successful bidder of the obligation to furnish all material and labor necessary to carry out the provisions of the contract. When a site visit is required by provisions located elsewhere in these Instructions to Bidders, as a site tour in conjunction with a mandatory Pre-Bid Meeting, it shall be the Bidder's responsibility to fulfill this obligation as a condition of bidding the Work described in the Bidding Documents.
- B. No allowance will be made for any additional compensation by reason of any matter or condition with which the bidder might have fully informed him/herself, but failed to do so prior to bidding. Insofar as possible, the Contractor and all subcontractors shall employ such methods or means in carrying out the work so as not to cause any interruption of, or interference with, the work of any other subcontractor or trade.

3.028 SUBCONTRACTS

- A. The Prime Contractor shall be responsible for notifying all subcontractors and suppliers and informing them that they are bound in each case by all applicable provisions of the bidding information and those of the proposed Form of Agreements as defined in the Contract Documents.

END OF SECTION

SECTION 00 2113.01

IMPACS Public Construction Bidders User Guide

Public construction bids must be submitted on-line at [IMPACS Electronic Procurement System](#).

Bidders must be registered in IMPACS to submit a Bid.

To create an account, enter your email address and click on "Next" and click "Create Account". Bidder must enter all fields noted with * including legal company name, contact first and last name, phone number, confirm email address, password, re-enter password, select account recovery question including answer, confirm answer, select box accepting websites use terms and conditions and select security check box "I'm not a robot".

On the [IMPACS Electronic Procurement System](#) Customer Portal Home page, Bidder selects "View Event" in the Sourcing Events section.

Sourcing Events ?				
Show	Opening or Closing Soon ▼		Go to Public Opportunities	
Event Number	Status	Event Title	Dates	Action
RFB923700-02	Open	Hoover East Side Pavers	Open: 4/27/2022 12:00:00 PM CDT Close: 5/5/2022 12:00:00 PM CDT	View Event ▼

Bidders can view event details including description, prerequisites, buyer attachments, questions and answers.

To submit a Bid, Bidder must select "**Yes, I intend to Bid**". Bidder must complete the following sections.

Prerequisites - Bidder must complete all prerequisites.

- Bidder must upload a file of the Bid Security/Bond for 5% of total Bid Amount and certify that if they are awarded the construction contract they will enter into the contract at the Bid Amount submitted.
- Bidder must upload the completed and signed Bid Form.
NOTE: Bids are to be entered on the Bid Form only; not in the IMPACS. As a result, IMPACS will display a bid amount of \$0.

Questions - Bidder must complete all questions.

Review & Submit - Bidder must select the certification box certifying that the statements and information in response are true and correct to the best of their knowledge and belief.

SECTION 00 2113.02

SAMPLE**CERTIFICATE OF LIABILITY INSURANCE**DATE (MM/DD/YYYY)
xx/xx/xxxx

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Agent's Name Agent's Address	CONTACT NAME: Agent's Information	
	PHONE (A/C, No, Ext):	FAX (A/C, No):
INSURED Trade Contractor's Name Trade Contractor's Mailing Address	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	
	INSURER A: Company A (AM Best Rated A/VI or Better)	NAIC # Admitted
	INSURER B:	Carriers
	INSURER C:	
	INSURER D:	
INSURER E:		
INSURER F:		

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSD WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	Minimum
* A	COMMERCIAL GENERAL LIABILITY	X X	#TBD- CGL	3/1/17	3/1/18	EACH OCCURRENCE	\$ 1,000,000
	CLAIMS-MADE ☒ OCCUR					DAMAGE TO RENTED PREMISES (Ea occurrence)	\$
						MED EXP (Any one person)	\$
						PERSONAL & ADV INJURY	\$ 1,000,000
						GENERAL AGGREGATE	\$ 2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:					PRODUCTS - COMPIOP AGG	\$ 1,000,000
	POLICY ☒ PROJECT ☐ LOC						\$
	OTHER:						\$
B	AUTOMOBILE LIABILITY	X X	#TBD-AL	3/1/17	3/1/18	COMBINED SINGLE LIMIT (Ea accident)	\$ 1,000,000
	ANY AUTO					BODILY INJURY (Per person)	\$
	ALL OWNED AUTOS					BODILY INJURY (Per accident)	\$
	SCHEDULED AUTOS					PROPERTY DAMAGE (Per accident)	\$
	HIRED AUTOS						\$
C	UMBRELLA LIAB	X X	#TBD-UMB	3/1/17	3/1/18	EACH OCCURRENCE	\$ 10,000,000
	EXCESS LIAB					AGGREGATE	\$
	DED RETENTION \$						\$
D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	Y/N N/A X	#TBD-WC	3/1/17	3/1/18	PER STATUTE	\$ 500,000
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)					E.L. EACH ACCIDENT	\$ 500,000
	If yes, describe under DESCRIPTION OF OPERATIONS below					E.L. DISEASE - EA EMPLOYEE	\$ 500,000
						E.L. DISEASE - POLICY LIMIT	\$ 500,000
* E	Owners Contrators Protective Liability		#TBD-OCF	3/1/17	3/1/18	*Limits equal to CGL (or) as required by owner (Note- Would be either CGL or OCF, not both)	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Additional Insured on a Primary & Non-Contributory basis (CGL;AL;UMB/Excess) in favor of : (Owner) Iowa Department of Administrative Services (DAS), Officers, Directors, Members, Consultants, Agents, and Employees.
Waiver of Subrogation (CGL;AL;WC/EL;UMB/Excess) in favor of: (Owner) Iowa Department of Administrative Services (DAS), Officers, Directors, Members, Consultants, Agents, and Employees.

Project XXXX.XX (Number varies by project)

CERTIFICATE HOLDER**CANCELLATION**

Iowa Department of Administrative Services (DAS)
109 SE 13th Street
Des Moines, IA 50319

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Signature

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ACORD 25 (2014/01)

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SECTION 00 3113

PRELIMINARY SCHEDULE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Preliminary Construction Schedule
- B. Schedule Durations

1.02 PRELIMINARY SCHEDULE

- A. A preliminary schedule has been identified by the Owner for the implementation of the Project. Refer to the schedule following this Section for references to anticipated milestones and construction duration.
- B. Each step of the Preliminary Schedule is subject to receipt of acceptable bids, Owner's decision process and date of commencement.
- C. A proposed construction schedule shall be submitted by all Trade Contractors to the Construction Manager no later than 48 hours prior to the pre-construction meeting. A revised Construction Schedule will be submitted by the Construction Manager once all preliminary schedules are reviewed and approved by the Owner.
- D. The final construction schedule will be established post award of bids with the cooperation of all contractors.

1.03 SCHEDULE DURATIONS

- A. Anticipated Notice of Intent to Award – June 17th, 2024
- B. Anticipated Date of Commencement – June 30th, 2024
- C. Substantial Completion by – April 10, 2025

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

			ICN Lucas CRAC Unit Replacements Schedule Update Layout - TH_2																22-May-24																																										
Activity Name	Remaining Duration	Start	Finish	Prev Start (BL1 Start)	Prev Finish (BL1 Finish)	DC Re	2024			June 2024				July 2024				August 2024				September 2024				October 2024				November 2024				December 2024				January 2025				February 2025				March 2025				April 2025				May 2025							
							2	19	26	02	09	16	23	30	07	14	21	28	04	11	18	25	01	08	15	22	29	06	13	20	27	03	10	17	24	01	08	15	22	29	05	12	19	26	02	09	16	23	02	09	16	23	30	06	13	20	27	04	11	18	25
ICN Lucas CRAC Unit Replacements																																																													
Milestones																																																													
Start of Design	0	22-May-24		22-May-24			◆ Start of Design																																																						
100% Bid Documents	0		22-May-24		22-May-24		◆ 100% Bid Documents																																																						
Procurement Start	0	22-May-24		22-May-24			◆ Procurement Start																																																						
Design Development Complete	0		22-May-24		22-May-24		◆ Design Development Complete																																																						
50% CDs Complete	0		22-May-24		22-May-24		◆ 50% CDs Complete																																																						
95% CDs Complete	0		22-May-24		22-May-24		◆ 95% CDs Complete																																																						
Contractors under Contract	0	28-Jun-24		28-Jun-24			◆ Contractors under Contract																																																						
Onsite Activities Start	0	22-Jan-25		22-Jan-25			◆ Onsite Activities Start																																																						
Substantial Completion	0		23-Apr-25		23-Apr-25		◆ Substantial Completion																																																						
Final Completion	0		23-Apr-25		23-Apr-25		◆ Final Completion																																																						
Preconstruction																																																													
Design Procurement																																																													
Commissioning Procurement																																																													
Design																																																													
Bid Letting																																																													
Issue RFB to Procurement	1	22-May-24*	22-May-24	22-May-24	22-May-24		Issue RFB to Procurement																																																						
Post RFB to TSB	2	23-May-24	24-May-24	23-May-24	24-May-24		Post RFB to TSB																																																						
RFB Procurement	13	28-May-24	13-Jun-24	28-May-24	13-Jun-24		RFB Procurement																																																						
RFB Pre-bid Meeting	0	05-Jun-24		05-Jun-24			◆ RFB Pre-bid Meeting																																																						
RFB Questions Due	0		07-Jun-24		07-Jun-24		◆ RFB Questions Due																																																						
RFB Final Addendum	0		11-Jun-24		11-Jun-24		◆ RFB Final Addendum																																																						
Bids Due	0		13-Jun-24		13-Jun-24		◆ Bids Due																																																						
Contractor NOIs	0	14-Jun-24		14-Jun-24			◆ Contractor NOIs																																																						
Contractor 5 Day Appeal Period	5	14-Jun-24	20-Jun-24	14-Jun-24	20-Jun-24		Contractor 5 Day Appeal Period																																																						
Contractor Contract Execution	10	14-Jun-24	27-Jun-24	14-Jun-24	27-Jun-24		Contractor Contract Execution																																																						
Construction																																																													
Procurement																																																													
Roof Top Condenser Submittal Development	10	28-Jun-24	12-Jul-24	28-Jun-24	12-Jul-24		Roof Top Condenser Submittal Development																																																						
CRAC Submittal Development	10	28-Jun-24	12-Jul-24	28-Jun-24	12-Jul-24		CRAC Submittal Development																																																						
Piping Material Submittal Development	10	28-Jun-24	12-Jul-24	28-Jun-24	12-Jul-24		Piping Material Submittal Development																																																						
Controls Submittal Development	20	28-Jun-24	26-Jul-24	28-Jun-24	26-Jul-24		Controls Submittal Development																																																						
Insulation Submittal Development	10	28-Jun-24	12-Jul-24	28-Jun-24	12-Jul-24		Insulation Submittal Development																																																						
Roof Top Condenser Submittal Review	10	15-Jul-24	26-Jul-24	15-Jul-24	26-Jul-24		Roof Top Condenser Submittal Review																																																						
CRAC Submittal Review	10	15-Jul-24	26-Jul-24	15-Jul-24	26-Jul-24		CRAC Submittal Review																																																						
Piping Material Submittal Review	10	15-Jul-24	26-Jul-24	15-Jul-24	26-Jul-24		Piping Material Submittal Review																																																						
Insulation Submittal Review	10	15-Jul-24	26-Jul-24	15-Jul-24	26-Jul-24		Insulation Submittal Review																																																						
Roof Top Condenser Submittal Ordered	2	29-Jul-24	30-Jul-24	29-Jul-24	30-Jul-24		Roof Top Condenser Submittal Ordered																																																						
CRAC Submittal Ordered	2	29-Jul-24	30-Jul-24	29-Jul-24	30-Jul-24		CRAC Submittal Ordered																																																						
Piping Material Submittal Ordered	2	29-Jul-24	30-Jul-24	29-Jul-24	30-Jul-24		Piping Material Submittal Ordered																																																						
Controls Submittal Review	10	29-Jul-24	09-Aug-24	29-Jul-24	09-Aug-24		Controls Submittal Review																																																						
Insulation Submittal Ordered	2	29-Jul-24	30-Jul-24	29-Jul-24	30-Jul-24		Insulation Submittal Ordered																																																						
Roof Top Condenser Procurement	110	31-Jul-24	07-Jan-25	31-Jul-24	07-Jan-25		Roof Top Condenser Procurement																																																						
CRAC Procurement	110	31-Jul-24	07-Jan-25	31-Jul-24	07-Jan-25		CRAC Procurement																																																						
Piping Material Procurement	10	31-Jul-24	13-Aug-24	31-Jul-24	13-Aug-24		Piping Material Procurement																																																						
Insulation Procurement	5	31-Jul-24	06-Aug-24	31-Jul-24	06-Aug-24		Insulation Procurement																																																						
Insulation Delivery	5	07-Aug-24	13-Aug-24	07-Aug-24	13-Aug-24		Insulation Delivery																																																						
Controls Submittal Review Meeting	5	12-Aug-24	16-Aug-24	12-Aug-24	16-Aug-24		Controls Submittal Review Meeting																																																						
Primary Baseline Critical Remaining Work				Page 1 of 2													Data Date: 22-May-24 Baseline:24.05.22 ICN Lucas CRAC Unit Replacements - B4																																												
Actual Work Milestone																																																													
Remaining Work																																																													

[illegible]

SECTION 00 3143

PERMIT APPLICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Permit Application Information
- B. Licenses, Permits, and Related Inspections

1.02 PERMIT APPLICATION INFORMATION

- A. State Building Code Plan Review: The plan review and inspections for this project have been applied for by the Architect. Please contact your inspector prior to construction and occupancy.
- B. State Building Code Energy Review: The energy code review and inspections for this project have been applied for by the Architect. Please contact your inspector prior to construction and occupancy.
- C. Electrical Permit and Inspections: Trade Contractor is responsible for permits and inspections.
- D. Other Applicable inspections: Trade Contractor is responsible for any other applicable project specific permits and inspections.

1.03 LICENSES, PERMITS, AND RELATED INSPECTIONS

- A. The Bidder shall comply with all codes, laws, ordinances, rules and regulations of any public authority having jurisdiction that bears on the performance of its work. All construction, materials and methods shall comply with the State Building Codes, except where plans and specifications establish a higher standard.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 00 4116

BID FORM

The Bid Form must be submitted online through the State's [IMPACS Electronic Procurement System](#).

RFB #935800-01

BID FORM for CONSTRUCTION CONTRACT
for
ICN Lucas CRAC Replacement
321 E 12th St. Des Moines, Iowa
Project 9358.00

Iowa Department of Administrative Services
Hoover State Office Building, Level 3
1305 East Walnut Street
Des Moines, Iowa 50319-0105

The following information is to be completed and submitted with your bid..

1. Bid Form - Completed and Signed (to be uploaded with bid submission)
2. Non Discrimination Clause Information
3. Contractor Targeted Small Business Enterprise Pre-Bid Contract Information
4. Bid Security – 5% of total Bid amount (to be uploaded with bid submission)

Authorized Representative:

The undersigned Bidder, in response to your Request for Bid for construction of the above project, having examined the Drawings, Specifications, and other Bidding Documents dated May 17th, 2024, and Addenda issued and acknowledged below as received and being familiar with all the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, equipment and supplies to perform all work to construct the project in strict accordance with the proposed Contract Documents, within the time and at the prices stated below. Prices are to cover all expenses incurred in performing the work required under the proposed Contract Documents, of which this bid is a part.

Bidder acknowledges receipt of the following Addenda which are a part of the Bidding Documents and for which any effect on cost of the Work is included in the bid amounts indicated:

Number	_____	_____	_____	_____	_____
Dated	_____	_____	_____	_____	_____

Note that the State of Iowa is exempt from State and Local sales and use taxes (including local option and school option) for this project. Taxes on construction materials shall NOT be included in the bid amounts.

Amounts shall be indicated in both words and figures. In case of discrepancy, the amount indicated in words shall govern.

BID PACKAGES:

BP 01

Description: CRAC Unit Replacement

Bidder proposes and agrees to perform all work as described in the Construction Documents for the sum of:

(\$ _____). Dollars

BP 02

Description: Electrical

Bidder proposes and agrees to perform all work as described in the Construction Documents for the sum of:

(\$ _____). Dollars

ALTERNATES:

ALT 01

Description: Temporary Cooling Provided by Owner (Remove From Bid Package #1 Scope)

Bidder proposes and agrees to provide a deduct for temporary cooling as described in the Construction Documents for the sum of:

(\$ _____). Dollars

Bidder hereby certifies that:

1. This bid is genuine and is not made in the interest of or on behalf of any undisclosed person, firm or corporation;
2. Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain any advantage over any other bidder or over the Owner.
3. Bidder hereby certifies that the Bidder is registered with the Iowa Labor Commissioner as a Contractor as required by Chapter 91C, Code of Iowa.

4. Bidder agrees to comply with all Federal and State Affirmative Action/Equal Employment Opportunity requirements concerning fair employment and will not discriminate between or among them by reason of race, color, religion, sex, national origin or physical handicap.
5. All construction under this Contract shall conform to the requirements of the *Iowa State Building Code*.
6. Bidder agrees that this bid shall remain valid and shall not be withdrawn for a period of thirty (30) calendar days after the date for receipt of bids.
7. Bidder agrees that if written notice of acceptance of this bid is mailed, emailed, or delivered to the undersigned within thirty (30) days after the date in which bids are due, or at any time thereafter before it is withdrawn, the undersigned will sign and return the Contract Agreement, prepared in accord with the Bidding Documents and this bid as accepted; and will also provide proof of insurance coverage and required surety bonds.
8. Bidder understands that the Owner reserves the right to reject any and all bids, and to waive irregularities or informalities and enter into a contract for the work, as the Owner deems to be in the best interest of the State.
9. Bidder understands that the Owner reserves the right to accept any, or no, Alternate Bid, if requested, and that the Alternate Bids may be considered in any order or combination, and the low Bidder shall be determined on the basis of the sum of the base bid and any Alternate(s) accepted.

Subcontractors:

The Trade Contractor must identify all Subcontractors and Suppliers within 48 hours of the published date and time for which bids must be submitted, in accordance with Iowa Code Section 8A311, as amended by House File 646 in 2011. Subcontractors and suppliers may not be changed without the approval of the Owner. Requests for changing a Subcontractor or supplier must identify the reason for the proposed change, the name of the new Subcontractor or supplier, and the change in the subcontractor or supplier price as a result of the change. Any reduction in subcontractor or supplier price as a result of the change, if the change is approved by the Owner, shall be deducted from the Trade Contract Price via a deductive Change Order. Any such changes, if approved by the Owner, which result in an increase in the Trade Contract Price shall be borne by the Trade Contractor.

Enforcement of Reciprocal Resident Bidder Preference, per Iowa Code 73A.21.

All bidders shall either check the box next to "Resident Bidder" or check the box next to "Nonresident Bidder" and by doing so and signing thereafter certifies and attests to the same. All information requested must be provided. Seek out the advice of an attorney if you have questions.

"Resident Bidder" means a person or entity authorized to transact business in of the State of Iowa and having a place of business for transacting business within the State of Iowa at which it is conducting and has conducted business for at least three years prior to the date of the first advertisement for the public improvement. Note, however, that if a nonresident bidder's state or foreign country has a more stringent definition of a resident bidder, the more stringent definition is applicable as to bidders from that state or foreign country.

☐

Resident Bidder

Name of Resident Bidder: _____

By: _____
Authorized Agent and Signatory of Resident Bidder

OR:



Nonresident Bidder

Name of Nonresident Bidder: _____

Name of State or Foreign Country of Nonresident Bidder: _____

Particularly identify and describe any preference, labor preference, or any other type of preferential treatment, in effect in the nonresident bidder's state or foreign country at the time of this bid:

NOTICE: Nonresident Bidders domiciled in a state or country with a resident labor force preference shall make and keep, for a period of not less than three years, accurate records of all workers employed on the public improvement. The records shall include each worker's name, address, telephone number when available, social security number, trade classification, and the starting ending time of employment.

By: _____
Authorized Agent and Signatory of Nonresident Bidder

Bid Form shall be signed by an officer of the company with authority to bind in a contract.
Notice of acceptance of this bid, or request for additional information by the Department of Administrative Services, may be addressed to the undersigned at the address set forth below:

Legal Name of Firm: _____

Date: _____

Signature of Bidder: _____

Title: _____

Typed Name of Signatory: _____

Email: _____

Business Address:

Telephone Number: _____ Fax Number: _____

Federal Tax Identification Number: _____

Iowa Contractor Registration Number: _____

Bidder Safety Manager Name: _____

For an out-of-state Bidder, Bidder certifies that the Resident Preference given by the State or Foreign Country of Bidder's residence, _____, is _____ %.

END OF SECTION

SECTION 00 4116.01

NON-DISCRIMINATION CLAUSE

This Section is for informational purposes only. All information will be submitted online through the State's [IMPACS Electronic Procurement System](#).

PART 1 - GENERAL

All contractors, subcontractors, vendors and suppliers of goods and services doing business with the State of Iowa and value of said business equals or exceeds \$10,000 annually, agree as stated below.

1.01 NONDISCRIMINATION CLAUSE

- A. The contractor, subcontractor, vendor and supplier of goods and services will not discriminate against an employee or applicant for employment because of race, creed, color, sex, national origin, ancestry, religion, economic status, age, disability, political opinion, or affiliations of an applicant or employee based upon the nature of the job occupation. The contractor, subcontractor, vendor and supplier will develop an Affirmative Action Program to insure that applicants are employed and that employees are treated during employment without regard to their race, creed, color, sex, national origin, ancestry, religion, economic status, age, disability, political opinions or affiliations. Such action shall include, but not be limited to the following:
 - 1. Employment.
 - 2. Upgrading.
 - 3. Demotion or transfer.
 - 4. Recruitment and advertising.
 - 5. Layoff or termination.
 - 6. Rates of pay or other forms of compensation.
 - 7. Selection for training, including apprenticeship.
- B. The contractor, subcontractor, vendor and supplier of goods and services will, in all solicitations or advertisements for employees, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex, national origin, ancestry, religion, economic status, age, disability, political opinion or affiliations.
- C. The contractor, subcontractor, vendor and supplier or their collective bargaining representative will send to each labor union or representative or workers with which they have a collective bargaining agreement or other contract or understanding, a notice advising the said labor union or workers' representative of the contractor's commitments under this section.
- D. The contractor, subcontractor, vendor and supplier of goods and services will comply with all published rules, regulations, directives and orders of the State of Iowa Affirmative Action Program Contract Compliance Provisions.
- E. The contractor, subcontractor, vendor and supplier of goods and services will furnish and file compliance reports within such time and upon such forms as provided by the Equal Employment Opportunity Officer, said forms may elicit information as to the policies, procedures, patterns, and practices of each subcontractor as state as the contractor themselves and said contractor, subcontractor, vendor and supplier will permit access to their employment books, records and accounts to the State's Equal Employment Opportunity Officer, for the purpose of investigation to ascertain compliance with this Contract and with rules regulations of the State's Affirmative Action Program.
- F. In the event of the contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations and orders; this Contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further contracts in accordance with procedures authorized by the State of Iowa.

- G. The contractor, subcontractor, vendor and supplier of goods and services will include, or incorporate by reference, the provisions of the nondiscrimination clause in every contract, subcontract or purchase order unless exempted by the rules, regulations or orders of the State's Affirmative Action Program, and will provide in every subcontract or purchase order that said provisions will be binding upon each contractor, subcontractor or seller.
- H. The parties agree to comply with "Compliance with the Law; Nondiscrimination in Employment" of the current Terms and Conditions at the award of this contract. Current Terms and Conditions may be found on the following web site and are, by this reference, made a part of this Agreement. <https://das.iowa.gov/procurement/terms-and-conditions>
- I. We certify and recognize that we are morally and legally committed to nondiscrimination in employment. Any person who applies for employment with our company will not be discriminated against because of race, creed, color, sex, national origin, ancestry, religion, economic status, age or disabilities, unless disabilities are based upon the nature of the job occupation.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 00 4116.02

TARGETED SMALL BUSINESS INFORMATION

This Section is for informational purposes only. All information will be submitted online through the State's [IMPACS Electronic Procurement System](#).

PART 1 - GENERAL

1.01 TARGETED SMALL BUSINESS INFORMATION

- A. Subcontractor Targeted Small Business Enterprise Pre-Bid Contact Information, including subcontractor and dollar amount to be subcontracted, is to accompany the Bid submission. Bidders shall comply with all affirmative action/equal opportunity provisions of State and Federal laws. The Owner seeks to provide opportunities for Targeted Small Businesses in accordance with the provisions of Chapter 73 of the Code of Iowa.
- B. [Search the Targeted Small Business Directory](#) for certified State of Iowa Targeted Small Businesses.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

CONTRACTOR	BID NO.	PAGE #

(to be completed by bidder)

You are requested to provide the information on this form showing your targeted Small Business enterprises contacts made prior to your bid submission. This information is subject to verification and confirmation. NOTE: The Department of General Services will not regard your acceptance or use of a low quote or bid from a non-targeted Small Business Enterprise on any subcontract item as evidence itself of any lack of good faith effort to solicit targeted Small Business Enterprise subcontractors on this project. However, every effort shall be made to solicit quotes or bids on as many subcontractable items as necessary to evidence affirmative action in contracting.

TABLE OF INFORMATION SHOWING BIDDER'S PRE-BID TARGETED SMALL BUSINESS ENTERPRISE CONTACTS

[illegible]

Total dollar amount proposed to be subcontracted to TSB on this project \$ _____
List items to be subcontracted. (If more space is needed, use reverse side.)

SECTION 00 4313

BID SECURITY FORMS

PART 1 - GENERAL

1.01 BID SECURITY FORMS

- A. A Bid Bond form will be required on this project. An amended ConsensusDocs 262 is attached for reference following this page. ConsensusDocs bid bond form is not required (other standard forms are acceptable to the State of Iowa).

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION



CONSENSUSDOCS 262 **BID BOND** **(AMENDED BY STATE OF IOWA)**

This document was developed through a collaborative effort of organizations representing a wide cross-section of the design and construction industry. The organizations endorsing this document believe it represents a fair allocation of risk and responsibilities for all project participants.

Endorsing organizations recognize that this document must be reviewed and adapted to meet specific needs and applicable laws. This document has important legal and insurance consequences. You are encouraged to consult legal, insurance and surety advisors before completing or modifying this document. The software includes a notes section indicating where information is to be inserted to complete this document. Further information and endorsing organizations' perspectives are available at www.consensusdocs.org/guidebook.

For Use with ConsensusDOCS 200, Standard Form of Agreement and General Conditions Between Owner and Constructor (Where the Contract Price is a Lump Sum) and ConsensusDOCS 500, Standard Agreement and General Conditions Between Owner and Construction Manager.

The Trade Contractor, _____ (the "Trade Contractor") has submitted a Bid to the Owner, _____ (the "Owner") for the _____ (the "Project") in accordance with the Bidding Documents, including Drawings and Specifications prepared by _____ (the "Design Professional").

By virtue of this Bid Bond (the "Bond"), the Constructor as Principal and _____ as Surety ("Surety"), are bound to the Owner as Obligor in the maximum amount _____, Dollars (\$_____) (the "Bond Sum"). The Constructor and Surety hereby bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein.

1. If the Obligor shall accept the bid of the Constructor, the Constructor shall enter into an Agreement with the Obligor in accordance with the terms of such Bid.
2. Constructor shall procure such bond or bonds as are specified in the Contract Documents for the faithful performance of the Work and for the prompt payment of labor and materials furnished in the performance of the Work.
3. If the Constructor fails to enter such Agreement and give such bonds, the Constructor shall pay to the Obligor the difference between the amount of Constructor's bid and the amount of such agreement the Obligor in good faith executes with another Party to perform the Work covered by Constructor's Bid, not to exceed the Bond Sum stated above.
4. If the Constructor shall fulfill its obligation under Articles 1 through 3, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

This Bond is entered into as of _____ (date)

SURETY: _____ (seal)

BY:

Print Name: _____

Print Title: _____ (Attach Power of Attorney)

Witness:

(Additional signatures, if any, appear on attached page)

Constructor: _____ (seal)

BY:

Print Name: _____

Print Title: _____

Witness:

(Additional signatures, if any, appear on attached page)

SECTION 00 5200

AGREEMENT FORM

PART 1 - GENERAL

1.01 AGREEMENT FORM

- A. The Form of Agreement to be used on this project is a modified ConsensusDocs 802. A sample is attached following this page.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

ConsensusDocs 802

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND TRADE CONTRACTOR

(Where the Construction Manager Is the Owner's Agent)



TABLE OF ARTICLES

1. AGREEMENT
2. GENERAL PROVISIONS
3. TRADE CONTRACTOR'S OBLIGATIONS
4. OWNER'S RESPONSIBILITIES
5. SUBCONTRACTS
6. TRADE CONTRACT TIME
7. TRADE CONTRACT PRICE
8. CHANGES
9. PAYMENT
10. INDEMNITY, INSURANCE, WAIVERS AND BONDS
11. SUSPENSION, NOTICE TO CURE AND TERMINATION OF AGREEMENT
12. DISPUTE MITIGATION AND RESOLUTION
13. MISCELLANEOUS PROVISIONS
14. TRADE CONTRACT DOCUMENTS

This Agreement has important legal and insurance consequences. Consultations with an attorney and with insurance and surety consultants are encouraged with respect to its completion or modification. Notes indicate where information is to be inserted to complete this Agreement.



ARTICLE 1 AGREEMENT

This Trade Contractor Agreement is made effective as of the XX day of Month, Year , by and between the

OWNER

State of Iowa - DAS, Department of Administrative Services ("DAS"). DAS's principal office is located: 109 SE 13th Street, Des Moines, IA 50319-0120.

and the

TRADE CONTRACTOR

Contractor Name

Address

City, State, Zip

for work in connection with the following

PROJECT

XXXX.XX - Project Name

The CONSTRUCTION MANAGER is

Construction Manager Name

Address

City, State, Zip

The DESIGN PROFESSIONAL for the Project is

Designer Name

Address

City, State, Zip

Notice to the Parties shall be given at the above addresses.

ARTICLE 2 GENERAL PROVISIONS

2.1 RELATIONSHIP OF PARTIES The Owner and the Trade Contractor agree to proceed with this Agreement on the basis of mutual trust, good faith and fair dealing and shall cooperate with each other and with the Construction Manager and Design Professional in furthering the Owner's interests. The Trade Contractor shall use its diligent efforts to perform the work in an expeditious manner consistent with the Trade Contract Documents. The Owner and the Trade Contractor will endeavor to promote harmony and cooperation among all Project participants.

2.1.1 The Owner and the Trade Contractor shall perform their obligations with integrity, ensuring at a minimum that

2.1.1.1 conflicts of interest shall be avoided or disclosed promptly to the other Party; and

2.1.1.2 the Trade Contractor and the Owner warrant that they have not and shall not pay nor receive any contingent fees or gratuities to or from the other Party, including its agents, officers and employees, Subcontractors or others for whom they may be liable, to secure preferential



treatment.

2.2 PROJECT ORGANIZATION This Agreement is for the performance of work described herein in connection with the construction of the Project. The Owner also may enter into separate agreements with other trade contractors for other portions of the Project. The Owner has entered or will enter into a Construction Management Agreement with the Construction Manager, and a design agreement with the Design Professional.

2.3 INDEPENDENT CONTRACTOR The Trade Contractor represents that it is an independent contractor and that its performance of the Trade Contract Work it shall act as an independent contractor. Neither Trade Contractor nor any of its agents or employees shall act on behalf of the Owner except as provided in this Agreement or unless authorized in writing by the Owner.

2.4 CONSTRUCTION MANAGER IS OWNER'S AGENT The Construction Manager will represent the Owner as its agent in the administration and management of this Agreement. Any instructions, reviews, approvals, orders or directions given to the Trade Contractor by the Construction Manager will be given on behalf of and as agent for the Owner. The Trade Contractor shall be obligated to respond or perform as if the same were given directly by the Owner. The Trade Contractor shall communicate and provide all requests and concerns regarding the Trade Contract Work to the Construction Manager. The Trade Contractor shall provide copies to the Construction Manager of all notices to the Owner required by and regarding this Agreement.

2.5 CONSTRUCTION MANAGER NOT IN PRIVITY WITH TRADE CONTRACTOR This Agreement shall not give the Trade Contractor any claim or right of action against the Construction Manager. The Trade Contractor and its subcontractors shall not be beneficiaries of any obligations of the Construction Manager. This Agreement shall not create a contractual relationship between any parties except the Owner and the Trade Contractor.

2.5A NO THIRD-PARTY BENEFICIARY There are no third-party beneficiaries of this Agreement.

2.6 DESIGN PROFESSIONAL The Owner, through its Design Professional, shall provide all architectural and engineering design services necessary for the completion of the Work, except the following:

No exceptions

The Trade Contractor shall not be required to provide professional services which constitute the practice of architecture or engineering except as otherwise provided in section 3.15.

2.6.1 The Owner shall obtain from the Design Professional either a license for Trade Contractor and Subcontractors to use the design documents prepared by the Design Professional or ownership of the copyrights for such design documents, and shall defend, indemnify and hold harmless the Trade Contractor against any suits or claims of infringement of any copyrights or licenses arising out of the use of the design documents. To the extent portions of this paragraph are in conflict with SF 396 (codified at Iowa Code Section 537A.5) said portions are void and unenforceable.

2.7 EXTENT OF AGREEMENT This Agreement is solely for the benefit of the Parties, represents the entire integrated agreement between the Parties, and supersedes all prior negotiations, representations and agreements, either written or oral. This Agreement and each and every provision is for the exclusive benefit of the Owner and the Trade Contractor and not for the benefit of any third party except to the extent expressly provided in this Agreement. In the event of conflict between this Agreement and any of the Exhibits or any other documents incorporated into this Agreement, the terms and provisions of this Agreement shall control.

2.8 DEFINITIONS



2.8.1 Agreement means this ConsensusDocs 802 Standard Form of Agreement Between Owner and Trade Contractor (Where the Construction Manager is the Owner's Agent), as modified by the Parties, and Exhibits and Attachments made part of this Agreement upon its execution.

2.8.2 Design Professional means the Architect, Design Professional or Engineer identified in ARTICLE 1 and its consultants, retained by Owner to perform design services for the Project, and licensed in the State in which the Project is located. The use of the term Design Professional in this Agreement is for convenience and is not intended to imply or infer that the individual or entity named in ARTICLE 1 will provide design professional services in a discipline in which it is not licensed.

2.8.3 Construction Manager means the Construction Manager identified in ARTICLE 1 and its authorized representative.

2.8.4 The Construction Schedule is the document initially prepared by and updated by the Construction Manager and approved by the Owner that indicates proposed activity sequences, durations, or milestone dates for such activities as receipt and approval of pertinent information, issuance of the Construction Documents, the preparation and processing of shop drawings and samples, delivery of materials or equipment requiring long-lead-time procurement, Owner's occupancy requirements and estimated dates of Substantial Completion and Final Completion of the Project.

2.8.5 The term Day shall mean calendar day unless otherwise specifically defined.

2.8.6 Final Completion occurs on the date when the Trade Contractor's obligations under this Agreement are complete and accepted by the Owner and final payment becomes due and payable, as established in ARTICLE 6. This date shall be confirmed by a Certificate of Final Completion signed by the Owner and the Trade Contractor.

2.8.7 A Hazardous Material is any substance or material identified now or in the future as toxic or hazardous under any federal, state or local law or regulation, or any other substance or material which may be considered hazardous or otherwise subject to statutory or regulatory requirements governing handling, disposal or clean-up.

2.8.8 A Material Supplier is a person or entity retained by the Trade Contractor to provide material or equipment for the Trade Contract Work. This definition is not intended to, and shall not be interpreted to, expand or modify the definition(s) of materials or material suppliers contained in Iowa Code Chapter 573.

2.8.9 Others means other contractors, material suppliers, and persons at the Worksite who are not employed by the Trade Contractor or Subcontractors.

2.8.10 The term Overhead shall mean a) payroll costs and other compensation of Trade Contractor employees in the Trade Contractor's principal and branch offices; b) general and administrative expenses of the Trade Contractor's principal and branch offices including deductibles paid on any insurance policy and c) the Trade Contractor's capital expenses, including interest on capital used for the Work.

2.8.11 Owner is the person or entity identified in ARTICLE 1 as Owner, and includes the Owner's representative.

2.8.12 The Project, as identified in ARTICLE 1, is the building, facility or other improvements for which the Trade Contractor is to perform the Trade Contract Work.

2.8.13 A Subcontractor is a person or entity retained by the Trade Contractor as an independent contractor to provide the labor, materials, equipment or services necessary to complete a specific



portion of the Work. This definition is not intended to, and shall not be interpreted to, expand or modify the definition(s) of materials or material suppliers contained in Iowa Code Chapter 573.

2.8.14 Per Iowa Code Section 26.13, "substantially completed" means the first date on which any of the following occurs: (1) Completion of the Project (or Trade Contract Work, in the case of the multiple Trade Contractors) or when the Project (or Trade Contract Work in the case of multiple Trade Contractors) has been substantially completed in general accordance with the terms and provisions of the contract. (2) The work on the Project (or Trade Contract Work in the case of multiple Trade Contractors) or on the designated portion is substantially completed in general accordance with the terms of the contract so that the State of Iowa can occupy or utilize the Project or designated portion of the Project for its intended purpose. (3) The Project (or Trade Contract Work in the case of multiple Trade Contractors) is certified as having been substantially completed by either of the following: (a) the architect or engineer authorized to make such certification (which is defined in this Agreement as the Design Professional). (b) The authorized contract representative (which is defined in this Agreement as the Owner's Representative). (4) The State of Iowa is occupying or utilizing the Project (or Trade Contract Work in the case of multiple Trade Contractors) for its intended purpose. This subparagraph shall not apply to highway, bridge, or culvert projects.

2.8.15 Terrorism means a violent act, or an act that is dangerous to human life, property or infrastructure, that is committed by an individual or individuals and that appears to be part of an effort to coerce a civilian population or to influence the policy or affect the conduct of any government by coercion. Terrorism includes, but is not limited to, any act certified by the United States government as an act of terrorism pursuant to the Terrorism Risk Insurance Act, as amended.

2.8.16 A Trade Contract Change Order is a written order signed by the Owner and the Trade Contractor after execution of this Agreement, indicating changes in the scope of the Trade Contract Work, the Trade Contract Price or Trade Contract Time, including substitutions proposed by the Trade Contractor and accepted by the Owner. Trade Contract Change Orders shall be executed using the ConsensusDOCS 813 Trade Contract Change Order (CM as Owner's Agent) form document with exhibits attached as necessary.

2.8.17 The Trade Contract Documents consist of this Agreement (as modified), the drawings, specifications, addenda issued prior to execution of this Agreement, approved submittals, information furnished by the Owner under subsection 4.1.3, the bid documents, other documents listed in this Agreement and any modifications issued after execution.

2.8.18 The Trade Contract Price is the amount indicated in section 7.1 of this Agreement.

2.8.19 The Trade Contract Time is the period between the Date of Commencement and Final Completion.

2.8.20 Trade Contract Work means the construction and services provided by the Trade Contractor.

2.8.20.1 Changed Work means work that is different from the original scope of Trade Contract Work; or work that changes the Trade Contract Price or Trade Contract Time.

2.8.20.2 Defective Work is any portion of the Trade Contract Work that is not in conformance with the Trade Contract Documents.

2.8.21 The Trade Contractor is the person or entity identified in ARTICLE 1 and includes the Trade Contractor's Representative.

2.8.22 The term Work means the construction and services necessary or incidental to fulfill the Trade



Contractors' obligations for the Project. The Work may refer to the whole Project or only a part of the Project.

2.8.23 Worksite means the geographical area at the location of the Project as identified in ARTICLE 1 where the Trade Contract Work is to be performed.

ARTICLE 3 TRADE CONTRACTOR'S OBLIGATIONS

3.1 GENERAL RESPONSIBILITIES

3.1.1 RESPONSIBILITIES The Trade Contractor shall provide all of the labor, materials, equipment and services necessary to complete the Trade Contract Work, all of which shall be provided in full accord with or as reasonably inferable from the Trade Contract Documents as being necessary to produce the indicated results.

3.1.2 The Trade Contractor shall be responsible for the supervision and coordination of the Trade Contract Work, including the construction means, methods, techniques, sequences and procedures utilized, unless the Trade Contract Documents give other specific instructions. In such case, the Trade Contractor shall not be liable to the Owner for damages resulting from compliance with such instructions unless the Trade Contractor recognized and failed to timely report to the Owner any error, inconsistency, omission or unsafe practice that it discovered in the specified construction means, methods, techniques, safety, sequences or procedures.

3.1.3 The Trade Contractor shall perform Trade Contract Work only within locations allowed by the Trade Contract Documents, applicable permits and applicable local law.

3.2 COOPERATION WITH WORK OF OWNER AND OTHERS

3.2.1 The Owner may perform work at the Worksite directly or by Others. Any agreements with Others to perform construction or operations related to the Project shall include provisions pertaining to insurance, indemnification, waiver of subrogation, coordination, interference, clean up and safety which are substantively the same as the corresponding provisions of this Agreement.

3.2.2 In the event that the Owner elects to perform work at the Worksite directly or by Others, the Trade Contractor and the Owner shall, with the assistance of the Construction Manager, coordinate the activities of all forces at the Worksite and agree upon fair and reasonable schedules and operational procedures for Worksite activities. The Owner shall require each separate contractor to cooperate with the Trade Contractor and assist with the coordination of activities and the review of construction schedules and operations. The Trade Contract Price and Trade Contract Time shall be equitably adjusted, as mutually agreed by the Parties, for subsequent changes made necessary by the coordination of construction activities, and the Trade Contractor's construction schedule and the Construction Schedule shall be revised accordingly. The Trade Contractor, Owner and Others shall adhere to the revised Construction Schedule until it may subsequently be revised.

3.2.3 With regard to the work of the Owner and Others, the Trade Contractor shall (a) proceed with the Trade Contract Work in a manner which does not hinder, delay or interfere with the work of the Owner or Others or cause the work of the Owner or Others to become defective, (b) afford the Owner or Others reasonable access for introduction and storage of their materials and equipment and performance of their activities, and (c) coordinate the Trade Contractor's construction and operations with theirs as required by this section.

3.2.4 Before proceeding with any portion of the Trade Contract Work affected by the construction or operations of the Owner or Others, the Trade Contractor shall give the Owner and Construction



Manager prompt written notification of any defects the Trade Contractor discovers in their work which will prevent the proper execution of the Trade Contract Work. The Trade Contractor's obligations in this section do not create a responsibility for the work of the Owner or Others, but are for the purpose of facilitating the Trade Contract Work. If the Trade Contractor does not notify the Owner and Construction Manager of patent defects interfering with the performance of the Trade Contract Work, the Trade Contractor acknowledges that the work of the Owner or Others is not defective and is acceptable for the proper execution of the Trade Contract Work. Following receipt of written notice from the Trade Contractor of defects, the Owner, through the Construction Manager, shall promptly inform the Trade Contractor what action, if any, the Trade Contractor shall take with regard to the defects.

3.3 RESPONSIBILITY FOR PERFORMANCE

3.3.1 In order to facilitate its responsibilities for completion of the Work in accordance with and as reasonably inferable from the Trade Contract Documents, prior to commencing the Work the Trade Contractor shall examine and compare the drawings and specifications with information furnished by the Owner pursuant to subsection 4.1.3, relevant field measurements made by the Trade Contractor and any visible conditions at the Worksite affecting the Trade Contract Work.

3.3.2 If in the course of the performance of the obligations in subsection 3.3.1 the Trade Contractor discovers any errors, omissions or inconsistencies in the Contract Documents, the Trade Contractor shall promptly report them to the Owner and Construction Manager. It is recognized, however, that the Trade Contractor is not acting in the capacity of a licensed design professional, and that the Trade Contractor's examination is to facilitate construction and does not create an affirmative responsibility to detect errors, omissions or inconsistencies or to ascertain compliance with applicable laws, building codes or regulations. Following receipt of written notice from the Trade Contractor of defects, the Owner shall promptly inform the Trade Contractor what action, if any, the Trade Contractor shall take with regard to the defects.

3.3.3 The Trade Contractor shall have no liability for errors, omissions or inconsistencies discovered under subsections 3.3.1 and 3.3.2 unless the Trade Contractor fails to report a recognized problem to the Owner and Construction Manager.

3.3.4 The Trade Contractor may be entitled to additional costs or time if there are changes in the scope of the Trade Contract Work that increase the cost of the Work or increase the number of days required to perform the Work, respectively, because of clarifications or instructions arising out of the Trade Contractor's reports described in the three preceding Subsections.

3.4 CONSTRUCTION PERSONNEL AND SUPERVISION

3.4.1 The Trade Contractor shall provide competent supervision for the performance of the Trade Contract Work. Before commencing the Trade Contract Work, Trade Contractor shall notify Owner and Construction Manager in writing of the name and qualifications of its proposed superintendent(s) and project manager so Owner and Construction Manager may review the individual's qualifications. If, for reasonable cause, the Owner or Construction Manager refuses to approve the individual, or withdraws its approval after once giving it, Trade Contractor shall name a different superintendent or project manager for Owner's and Construction Manager's review. Any disapproved superintendent shall not perform in that capacity thereafter at the Worksite.

3.4.2 The Trade Contractor shall be responsible to the Owner for acts or omissions of parties or entities performing portions of the Trade Contract Work for or on behalf of the Trade Contractor or any of its Subcontractors.

3.4.3 The Trade Contractor shall permit only qualified persons to perform the Trade Contract Work. The



Trade Contractor shall enforce safety procedures, strict discipline and good order among persons performing the Trade Contract Work. If the Owner or Construction Manager determines that a particular person does not follow safety procedures, or is unfit or unskilled for the assigned work, the Trade Contractor shall immediately reassign the person on receipt of the Owner's or Construction Manager's written notice to do so.

3.4.4 TRADE CONTRACTOR'S REPRESENTATIVE The Trade Contractor's authorized representative is . The Trade Contractor's representative shall possess full authority to receive instructions from the Owner and to act on those instructions. The Trade Contractor shall notify the Owner and the Construction Manager in writing of a change in the designation of the Trade Contractor's representative. The Trade Contractor's representative is also authorized to bind the Trade Contractor in all matters relating to this Agreement including, without limitation, all matters requiring the Trade Contractor's approval, authorization, or written notice. The Trade Contractor's representative is also authorized to resolve disputes in accordance with Section 12.2 of this Agreement.

3.5 MATERIALS FURNISHED BY THE OWNER OR OTHERS

3.5.1 In the event the Trade Contract Work includes installation of materials or equipment furnished by the Owner or Others, it shall be the responsibility of the Trade Contractor to examine the items so provided and thereupon handle, store and install the items, unless otherwise provided in the Trade Contract Documents, with such skill and care as to provide a satisfactory and proper installation. Loss or damage due to acts or omissions of the Trade Contractor shall be the responsibility of the Trade Contractor and may be deducted from any amounts due or to become due the Trade Contractor. Any defects discovered in such materials or equipment shall be reported at once to the Owner and Construction Manager. Following receipt of written notice from the Trade Contractor of defects, the Owner shall promptly inform the Trade Contractor what action, if any, the Trade Contractor shall take with regard to the defects.

3.6 TESTS AND INSPECTIONS

3.6.1 The Trade Contractor shall schedule all required tests, approvals and inspections of the Trade Contract Work or portions thereof at appropriate times so as not to delay the progress of the Trade Contract Work or other work related to the Project. The Trade Contractor shall give proper notice to the Construction Manager and to all required parties of such tests, approvals and inspections. If feasible, the Owner and Others may timely observe the tests at the normal place of testing. Except as provided in subsection 3.6.3, the Owner shall bear all expenses associated with tests, inspections and approvals required by the Trade Contract Documents, which, unless otherwise agreed to, shall be conducted by an independent testing laboratory or entity retained by the Owner. Unless otherwise required by the Trade Contract Documents, required certificates of testing, approval or inspection shall be secured by the Trade Contractor and promptly delivered to the Owner and Construction Manager.

3.6.2 If the Owner, Construction Manager or appropriate authorities determine that tests, inspections or approvals in addition to those required by the Trade Contract Documents will be necessary, the Trade Contractor shall arrange for the procedures and give timely notice to the Owner, Construction Manager and Others who may observe the procedures. Costs of the additional tests, inspections or approvals are at the Owner's expense except as provided in subsection 3.6.3.

3.6.3 If the procedures described in subsections 3.6.1 and 3.6.2 indicate that portions of the Trade Contract Work fail to comply with the Trade Contract Documents, the Trade Contractor shall be responsible for costs of correction and retesting.

3.7 WARRANTY



3.7.1 The Trade Contract Work shall be executed in accordance with the Trade Contract Documents in a workmanlike manner. The Trade Contractor warrants that all materials and equipment shall be furnished in sufficient quantities to facilitate the proper and expeditious execution of the Trade Contract Work and shall be new unless otherwise specified, of good quality, in conformance with the Trade Contract Documents, and free from defective workmanship and materials. At the Owner's or Construction Manager's request, the Trade Contractor shall furnish satisfactory evidence of the quality and type of materials and equipment furnished. The Trade Contractor further warrants that the Trade Contract Work shall be free from material defects not intrinsic in the design or materials required in the Trade Contract Documents. The Trade Contractor's warranty does not include remedies for defects or damages caused by normal wear and tear during normal usage, use for a purpose for which the Project was not intended, improper or insufficient maintenance, modifications performed by the Owner or Others, or abuse. The Trade Contractor's warranty pursuant to this section shall commence on the Date of Substantial Completion.

3.7.2 The Trade Contractor shall obtain from its Subcontractors and material suppliers any special or extended warranties required by the Trade Contract Documents. All such warranties shall be listed in an attached Exhibit to this Agreement.

3.8 CORRECTION OF TRADE CONTRACT WORK WITHIN ONE YEAR

3.8.1 If, prior to Substantial Completion and within one year after the date of Substantial Completion of the Trade Contract Work, any Defective Work is found, the Owner shall promptly notify the Trade Contractor in writing. Unless the Owner provides written acceptance of the condition, the Trade Contractor shall promptly correct the Defective Work at its own cost and time and bear the expense of additional services required for correction of any Defective Work for which it is responsible. If within the one-year correction period the Owner discovers and does not promptly notify the Trade Contractor or give the Trade Contractor an opportunity to test or correct Defective Work as reasonably requested by the Trade Contractor, the Owner waives the Trade Contractor's obligation to correct that Defective Work as well as the Owner's right to claim a breach of the warranty with respect to that Defective Work.

3.8.2 With respect to any portion of Trade Contract Work first performed after Substantial Completion, the one-year correction period shall be extended by the period of time between Substantial Completion and the actual performance of the later Trade Contract Work. Correction periods shall not be extended by corrective work performed by the Trade Contractor.

3.8.3 If the Trade Contractor fails to correct Defective Work within a reasonable time after receipt of written notice from the Owner prior to final payment, the Owner may correct it in accordance with the Owner's right to carry out the Trade Contract Work in section 11.2. In such case, an appropriate Trade Contract Change Order shall be issued deducting the cost of correcting such deficiencies from payments then or thereafter due the Trade Contractor. If payments then or thereafter due Trade Contractor are not sufficient to cover such amounts, the Trade Contractor shall pay the difference to the Owner.

3.8.4 If after the one-year correction period but before the applicable limitation period the Owner discovers any Defective Work, the Owner shall, unless the Defective Work requires emergency correction, promptly notify the Trade Contractor. If the Trade Contractor elects to correct the Defective Work, it shall provide written notice of such intent within fourteen (14) Days of its receipt of notice from the Owner. The Trade Contractor shall complete the correction of Defective Work within a time frame mutually agreed upon by the Trade Contractor and the Owner. If the Trade Contractor does not elect to correct the Defective Work, the Owner may have the Defective Work corrected by itself or Others and charge the Trade Contractor for the reasonable cost of the correction and other directly related



expenses. Owner shall provide Trade Contractor with an accounting of correction costs it incurs.

3.8.5 If the Trade Contractor's correction or removal of Defective Work causes damage to or destroys other completed or partially completed Work or existing buildings, the Trade Contractor shall be responsible for the cost of correcting the destroyed or damaged property.

3.8.6 The one-year period for correction of Defective Work does not constitute a limitation period with respect to the enforcement of the Trade Contractor's other obligations under the Trade Contract Documents.

3.8.7 Prior to final payment, at the Owner's option and with the Trade Contractor's agreement, the Owner may elect to accept Defective Work rather than require its removal and correction. In such case the Contract Price shall be equitably adjusted for any diminution in the value of the Project caused by such Defective Work. Before the Owner accepts any such change it must be documented in writing with a Change Order signed by both the Trade Contractor and Owner.

3.9 CORRECTION OF COVERED TRADE CONTRACT WORK

3.9.1 On request of the Owner or Construction Manager, Trade Contract Work that has been covered without a requirement that it be inspected prior to being covered may be uncovered for the Owner's or Construction Manager's inspection. The Owner shall pay for the costs of uncovering and replacement if the Work proves to be in conformance with the Trade Contract Documents, or if the defective condition was caused by the Owner or Others. If the uncovered Trade Contract Work proves to be defective, the Trade Contractor shall pay the costs of uncovering and replacement.

3.9.2 If contrary to specific requirements in the Trade Contract Documents or contrary to a specific request from the Owner or Construction Manager, a portion of the Trade Contract Work is covered, the Owner or Construction Manager, by written request, may require the Trade Contractor to uncover the Trade Contract Work for the Owner's or Construction Manager's observation. In this circumstance the Trade Contract Work shall be uncovered and recovered at the Trade Contractor's expense and with no adjustment to the Trade Contract Time. Costs incurred by the Owner as a direct result of the above shall be deducted from the Trade Contract Price.

3.10 SAFETY OF PERSONS AND PROPERTY

3.10.1 SAFETY PRECAUTIONS AND PROGRAMS The Trade Contractor shall have overall responsibility for safety precautions and programs in the performance of the Trade Contract Work. While this section establishes the responsibility for safety between the Owner and Trade Contractor, it does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with the provisions of applicable laws and regulations.

3.10.2 The Trade Contractor shall seek to avoid injury, loss or damage to persons or property by taking reasonable steps to protect:

3.10.2.1 its employees and other persons at the Worksite;

3.10.2.2 materials and equipment stored at on-site or off-site locations for use in the Trade Contract Work; and

3.10.2.3 property located at the site and adjacent to Trade Contract Work areas, whether or not the property is part of the Trade Contract Work.

3.10.3 TRADE CONTRACTOR'S SAFETY REPRESENTATIVE The Trade Contractor's Worksite Safety Representative is who shall act as the Trade Contractor's authorized safety representative with a duty



to prevent accidents in accordance with subsection 3.10.2 If no individual is identified in this section, the authorized safety representative shall be the Trade Contractor's Representative. The Trade Contractor shall report immediately in writing to the Owner and Construction Manager all recordable accidents and injuries occurring at the Worksite. When the Trade Contractor is required to file an accident report with a public authority, the Trade Contractor shall furnish a copy of the report to the Owner and Construction Manager.

3.10.4 The Trade Contractor shall provide the Owner and Construction Manager with copies of all notices required of the Trade Contractor by law or regulation. The Trade Contractor's safety program shall comply with the requirements of governmental and quasi-governmental authorities having jurisdiction.

3.10.5 Damage or loss not insured under property insurance which may arise from the Trade Contract Work, to the extent caused by the negligent acts or omissions of the Trade Contractor, or anyone for whose acts the Trade Contractor may be liable, shall be promptly remedied by the Trade Contractor.

3.10.6 If the Owner or Construction Manager deems any part of the Trade Contract Work or Worksite unsafe, the Owner or Construction Manager, without assuming responsibility for the Trade Contractor's safety program, may require the Trade Contractor to stop performance of the Trade Contract Work or take corrective measures satisfactory to the Owner, or both. If the Trade Contractor does not adopt corrective measures, the Owner may perform them and deduct their cost from the Trade Contract Price. The Trade Contractor agrees to make no claim for damages, for an increase in the Trade Contract Price or for a change in the Trade Contract Time based on the Trade Contractor's compliance with the Owner's or Construction Manager's reasonable request.

3.11 EMERGENCIES

3.11.1 In an emergency, the Trade Contractor shall act in a reasonable manner to prevent personal injury or property damage. Any change in the Trade Contract Price or Trade Contract Time resulting from the actions of the Trade Contractor in an emergency situation shall be determined as provided in ARTICLE 8.

3.12 HAZARDOUS MATERIALS

3.12.1 The Trade Contractor shall not be obligated to commence or continue Trade Contract Work until any Hazardous Material discovered at the Worksite has been removed, rendered or determined to be harmless by the Owner as certified by an independent testing laboratory and approved by the appropriate government agency.

3.12.2 If after the commencement of the Trade Contract Work a Hazardous Material is discovered at the Worksite, the Trade Contractor shall be entitled to immediately stop Trade Contract Work in the affected area. The Trade Contractor shall report the condition to the Owner, the Construction Manager, and, if required, the government agency with jurisdiction.

3.12.3 The Trade Contractor shall not be required to perform any Trade Contract Work relating to or in the area of Hazardous Material without written mutual agreement.

3.12.4 The Owner shall be responsible for retaining an independent testing laboratory to determine the nature of the Hazardous Material encountered and whether the material requires corrective measures or remedial action. Such measures shall be the sole responsibility of the Owner, and shall be performed in a manner minimizing any adverse effects upon the Trade Contract Work. The Trade Contractor shall resume Trade Contract Work in the area affected by any Hazardous Material only upon written agreement between the Parties after the Hazardous Material has been removed or rendered harmless



and only after approval, if necessary, of the governmental agency with jurisdiction.

3.12.5 If the Trade Contractor incurs additional costs or is delayed due to the presence or remediation of Hazardous Material, the Trade Contractor shall be entitled to an equitable adjustment in the Trade Contract Price or the Trade Contract Time.

3.12.6 To the extent not caused by the negligent acts or omissions of the Trade Contractor, its Subcontractors and Sub-subcontractors, and the agents, officers, directors and employees of each of them, the Owner shall defend, indemnify and hold harmless the Trade Contractor, its Subcontractors and Sub-subcontractors, and the agents, officers, directors and employees of each of them, from and against any and all direct claims, damages, losses, costs and expenses, including but not limited to attorney's fees, costs and expenses incurred in connection with any dispute resolution process, to the extent permitted pursuant to section 6.6, arising out of or relating to the performance of the Trade Contract Work in any area affected by Hazardous Material. To the extent portions of this paragraph are in conflict with SF 396 (codified at Iowa Code Section 537A.5) said portions are void and unenforceable.

3.12.7 MATERIALS BROUGHT TO THE WORKSITE

3.12.7.1 Material Safety Data (MSD) sheets as required by law and pertaining to materials or substances used or consumed in the performance of the Trade Contract Work, whether obtained by the Trade Contractor, Subcontractors, the Owner or Others, shall be maintained at the Worksite by the Trade Contractor and made available to the Owner, Construction Manager, Subcontractors and Others.

3.12.7.2 The Trade Contractor shall be responsible for the proper delivery, handling, application, storage, removal and disposal of all materials and substances brought to the Worksite by the Trade Contractor in accordance with the Trade Contract Documents and used or consumed in the performance of the Trade Contract Work.

3.12.7.3 The Trade Contractor shall indemnify and hold harmless the Owner, Construction Manager, their agents, officers, directors and employees, from and against any and all claims, damages, losses, costs and expenses, including but not limited to attorney's fees, costs and expenses incurred in connection with any dispute resolution procedure, arising out of or relating to the delivery, handling, application, storage, removal and disposal of all materials and substances brought to the Worksite by the Trade Contractor in accordance or not in accordance with the Trade Contract Documents. To the extent portions of this paragraph are in conflict with SF 396 (codified at Iowa Code Section 537A.5) said portions are void and unenforceable.

3.12.8 The terms of this section shall survive the completion of the Trade Work or any termination of this Agreement.

3.13 SUBMITTALS

3.13.1 The Trade Contractor shall submit to the Construction Manager, and the Design Professional, for review and approval all shop drawings, samples, product data and similar submittals required by the Trade Contract Documents. Submittals may be submitted in electronic form if required in accordance with ConsensusDocs 200.2 and subsection 4.4.1. The Trade Contractor shall be responsible to the Owner for the accuracy and conformity of its submittals to the Trade Contract Documents. The Trade Contractor shall prepare and deliver its submittals in a manner consistent with the Construction Schedule and in such time and sequence so as not to delay the performance of the Trade Contract Work or the work of the Owner and Others. When the Trade Contractor delivers its submittals the Trade Contractor shall identify in writing for each submittal all changes, deviations or substitutions from the requirements of the Trade Contract Documents. The review and approval of any Trade Contractor



submittal shall not be deemed to authorize changes, deviations or substitutions from the requirements of the Trade Contract Documents unless express written approval is obtained from the Owner specifically authorizing such deviation, substitution or change. To the extent a change, deviation or substitution causes an impact to the Contract Price or Contract Time, such approval shall be promptly memorialized in a Change Order. Further, the Construction Manager and Design Professional shall not make any change, deviation or substitution through the submittal process without specifically identifying and authorizing such deviation to the Trade Contractor. In the event that the Trade Contract Documents do not contain submittal requirements pertaining to the Trade Contract Work, the Trade Contractor agrees upon request to submit in a timely fashion to the Construction Manager and the Design Professional for review and approval any shop drawings, samples, product data, manufacturers' literature or similar submittals as may reasonably be required by the Owner, Construction Manager, or Design Professional.

3.13.2 The Owner shall be responsible for review and approval of submittals with reasonable promptness to avoid causing delay.

3.13.3 The Trade Contractor shall perform all Trade Contract Work strictly in accordance with approved submittals. Approval of shop drawings is not authorization to Trade Contractor to perform Changed Work, unless the procedures of ARTICLE 8 are followed. Approval does not relieve the Trade Contractor from responsibility for Defective Work resulting from errors or omissions of any kind on the approved Shop Drawings.

3.13.4 Record copies of the following, incorporating field changes and selections made during construction, shall be maintained by the Trade Contractor at the Project site and available to the Owner upon request: drawings, specifications, addenda, Trade Contract Change Order and other modifications, and required submittals including product data, samples and shop drawings.

3.13.5 No substitutions shall be made in the Trade Contract Work unless permitted in the Trade Contract Documents and then only after the Trade Contractor obtains approvals required under the Trade Contract Documents for substitutions. All such substitutions shall be promptly memorialized in a Change Order no later than seven (7) Days following approval by the Owner and, if applicable, provide for an adjustment in the Contract Price or Contract Time.

3.13.6 The Trade Contractor shall prepare and submit to the Construction Manager for submission to the Owner

(Check one only)

- ☒ final marked up as-built drawings
- ☐ updated electronic data, in accordance with ConsensusDocs 200.2 and section 4.4.1
- ☐ such documentation as defined by the Parties by attachment to this Agreement,

in general documenting how the various elements of the Trade Contract Work were actually constructed or installed.

3.14 PROFESSIONAL SERVICES

3.14.1 The Trade Contractor may be required to procure professional services in order to carry out its responsibilities for construction means, methods, techniques, sequences and procedures for such services specifically called for by the Contract Documents. The Trade Contractor shall obtain these professional services and any design certifications required from State of Iowa licensed design professionals. All drawings, specifications, calculations, certifications and submittals prepared by such



design professionals shall bear the signature and seal of such design professionals and the Owner and the Design Professional shall be entitled to rely upon the adequacy, accuracy and completeness of such design services. If professional services are specifically required by the Contract Documents, the Owner shall indicate all required performance and design criteria. The Trade Contractor shall not be responsible for the adequacy of such performance and design criteria. The Trade Contractor shall not be required to provide such services in violation of existing laws, rules and regulations in the jurisdiction where the Project is located.

3.15 WORKSITE CONDITIONS

3.15.1 WORKSITE VISIT The Trade Contractor acknowledges that it has visited, or has had the opportunity to visit, the Worksite to visually inspect the general and local conditions which could affect the Trade Contract Work.

3.15.2 CONCEALED OR UNKNOWN SITE CONDITIONS If the conditions at the Worksite are (a) subsurface or other concealed physical conditions which are materially different from those indicated in the Trade Contract Documents, or (b) unusual and unknown physical conditions which are materially different from conditions ordinarily encountered and generally recognized as inherent in Trade Contract Work provided for in the Trade Contract Documents, the Trade Contractor shall stop Trade Contract Work and give immediate written notice of the condition to the Owner, Construction Manager and the Design Professional. The Trade Contractor shall not be required to perform any work relating to the unknown condition without the written mutual agreement of the Parties. Any change in the Contract Price or the Contract Time as a result of the unknown condition shall be determined as provided in this article. The Trade Contractor shall provide the Owner and the Construction Manager with written notice of any claim as a result of unknown conditions within the time period set forth in section 8.4.

3.16 PERMITS AND TAXES

3.16.1 Trade Contractor shall give public authorities all notices required by law and, except for permits and fees which are the responsibility of the Owner pursuant to section 4.2, shall obtain and pay for all necessary permits, licenses and renewals pertaining to the Trade Contract Work. Trade Contractor shall provide to Owner copies of all notices, permits, licenses and renewals required under this Agreement.

3.16.2 Trade Contractor shall pay all applicable taxes legally enacted when bids are received or negotiations concluded for the Trade Contract Work provided by the Trade Contractor.

3.16.3 The Contract Price or Contract Time shall be equitably adjusted by Trade Contract Change Order for additional costs resulting from any changes in laws, ordinances, rules and regulations enacted after the date of this Agreement, including increased taxes.

3.16.3 (Deleted)

3.17 CUTTING, FITTING AND PATCHING

3.17.1 The Trade Contractor shall perform cutting, fitting and patching necessary to coordinate the various parts of the Trade Contract Work and to prepare its Trade Contract Work for the work of the Owner or Others.

3.17.2 Cutting, patching or altering the work of the Owner or Others shall be done with the prior written approval of the Owner. Such approval shall not be unreasonably withheld.

3.18 CLEANING UP

3.18.1 The Trade Contractor shall regularly remove debris and waste materials at the Worksite resulting



from the Trade Contract Work. Prior to discontinuing Trade Contract Work in an area, the Trade Contractor shall clean the area and remove all rubbish and its construction equipment, tools, machinery, waste and surplus materials. The Trade Contractor shall minimize and confine dust and debris resulting from construction activities. At the completion of the Trade Contract Work, the Trade Contractor shall remove from the Worksite all construction equipment, tools, surplus materials, waste materials and debris.

3.18.2 If the Trade Contractor fails to commence compliance with cleanup duties within two (2) business Days after written notification from the Owner or the Construction Manager of noncompliance, the Owner may implement appropriate cleanup measures without further notice and the cost shall be deducted from any amounts due or to become due the Trade Contractor in the next payment period.

3.19 ACCESS TO TRADE CONTRACT WORK The Trade Contractor shall facilitate the access of the Owner, Construction Manager, Design Professional and Others to Trade Contract Work in progress.

3.20 COST MONITORING The Trade Contractor shall provide the Construction Manager with cost monitoring information appropriate for the manner of Trade Contractor's compensation, to enable the Construction Manager to develop and track construction and project budgets, including amounts for work in progress, uncompleted work and proposed changes.

3.21 ROYALTIES, PATENTS AND COPYRIGHTS The Trade Contractor shall pay all royalties and license fees which may be due on the inclusion of any patented or copyrighted materials, methods or systems selected by the Trade Contractor and incorporated in the Trade Contract Work. The Trade Contractor shall defend, indemnify and hold the Owner harmless from all suits or claims for infringement of any patent rights or copyrights arising out of such selection. The Owner agrees to indemnify and hold the Trade Contractor harmless from any suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods or systems specified by the Owner, Construction Manager and Design Professional. To the extent portions of this paragraph are in conflict with SF 396 (codified at Iowa Code Section 537A.5) said portions are void and unenforceable.

3.22 CONFIDENTIALITY The Owner shall treat as confidential information all of the Trade Contractor's estimating systems and historical and parameter cost data that may be disclosed to the Owner in connection with the performance of this Agreement if they are specified and marked as confidential and shall mark them. If a document is not marked as "Confidential" it will not be treated as such. Nothing contained herein, however, shall be interpreted in a manner that modifies or is in conflict with the purpose and application of the open records laws contained in the Code of Iowa.

ARTICLE 4 OWNER'S RESPONSIBILITIES

4.1 INFORMATION SERVICES

4.1.1 FULL INFORMATION Any information or services to be provided by the Owner shall be provided in a timely manner so as not to delay the Trade Contract Work.

4.1.2 FINANCIAL INFORMATION Upon the written request of the Trade Contractor, the Owner shall provide the Trade Contractor with evidence of Project financing. If requested in writing, evidence of such financing shall be a condition precedent to the Trade Contractor's commencing or continuing the Trade Contract Work. The Trade Contractor shall be notified by the Owner prior to any material change in Project financing.

4.1.3 WORKSITE INFORMATION Except to the extent that the Trade Contractor knows of any inaccuracy, the Trade Contractor is entitled to rely on Worksite information furnished by the Owner pursuant to this subsection. To the extent the Owner has obtained, or is required elsewhere in the



Trade Contract Documents to obtain, the following Worksite information, the Owner shall provide at the Owner's expense and with reasonable promptness:

4.1.3.1 information describing the physical characteristics of the site, including surveys, site evaluations, legal descriptions, data or drawings depicting existing conditions, subsurface conditions and environmental studies, reports and investigations;

4.1.3.2 tests, inspections and other reports dealing with environmental matters, Hazardous Material and other existing conditions, including structural, mechanical and chemical tests, required by the Trade Contract Documents or by law; and

4.1.3.3 any other information or services requested in writing by the Trade Contractor which are relevant to the Trade Contractor's performance of the Trade Contract Work and under the Owner's control. The information required by subsection 4.1.3 shall be provided in reasonable detail. Legal descriptions shall include easements, title restrictions, boundaries, and zoning restrictions. Worksite descriptions shall include existing buildings and other construction and all other pertinent site conditions. Adjacent property descriptions shall include structures, streets, sidewalks, alleys, and other features relevant to the Trade Contract Work. Utility details shall include available services, lines at the Worksite and adjacent and connection points. The information shall include public and private information, subsurface information, grades, contours, and elevations, drainage data, exact locations and dimensions, and benchmarks that can be used by the Trade Contractor in laying out the Trade Contract Work. The Trade Contractor shall in writing request from the Owner any information identified in Paragraph 4.1.3 that the Trade Contractor believes the Owner has obtained but has not provided to the Trade Contractor.

4.1.3.4 OWNER'S REPRESENTATIVE The Owner's representative is test. The Owner's representative shall have authority to bind the Owner in all matters relating to this Agreement including, without limitation, all matters requiring the Owner's approval, authorization or written notice. If the Owner changes its representative as listed above, the Owner shall notify the Trade Contractor in advance in writing. The Owner's Representative is also authorized to resolve disputes in accordance with Section 12.2 of this Agreement. The Construction Manager, while unauthorized to modify the Agreement or settle a dispute without the Owner's approval, however, does have the requisite authority to act as the Owner's agent throughout the construction of the Project in accordance with the contract between the Owner and the Construction Manager (ConsensusDOCS 801 as modified by the State of Iowa).

4.2 BUILDING PERMIT, FEES AND APPROVALS Except for those permits and fees related to the Trade Contract Work which are the responsibility of the Trade Contractor pursuant to subsection 3.16.1, the Owner shall secure and pay for all other permits, approvals, easements, assessments and fees required for the development, construction, use or occupancy of permanent structures or for permanent changes in existing facilities, including the building permit.

4.3 Deleted

4.4 TRADE CONTRACT DOCUMENTS Unless otherwise specified, Owner shall provide One (1) copies of the Trade Contract Documents to the Trade Contractor without cost. Additional copies will be provided to the Trade Contractor at cost. This paragraph is not intended to be in conflict with Iowa Code Section 26.3 requirement that a sufficient number of copies of the contract documents be made available to bidders without charge (but a deposit not to exceed \$250 per set may be required). If the Trade Contractor was required to make a deposit for a set of Trade Contract Documents for purposes of bidding then the Trade Contractor may elect to have the deposit returned instead of being provided with an additional copy.



4.4.1 DIGITIZED DOCUMENTS If the Owner requires that the Owner, Design Professional, Construction Manager and Trade Contractor exchange documents and data in electronic or digital form, prior to any such exchange, the Owner, Design Professional, Construction Manager and Trade Contractor shall agree on a written protocol governing all exchanges in ConsensusDocs 200.2 or a separate Agreement, which, at a minimum, shall specify: (a) the definition of documents and data to be accepted in electronic or digital form or to be transmitted electronically or digitally; (b) management and coordination responsibilities; (c) necessary equipment, software and services; (d) acceptable formats, transmission methods and verification procedures; (e) methods for maintaining version control; (f) privacy and security requirements; and (g) storage and retrieval requirements. Except as otherwise agreed to by the Parties in writing, the Parties shall each bear their own costs as identified in the protocol. In the absence of a written protocol, use of documents and data in electronic or digital form shall be at the sole risk of the recipient.

4.5 OWNER'S CUTTING AND PATCHING Cutting, patching or altering the Trade Contract Work by the Owner or Others shall be done with the prior written approval of the Trade Contractor, which approval shall not be unreasonably withheld.

4.6 OWNER'S RIGHT TO CLEAN UP In case of a dispute between the Trade Contractor and Others with regard to respective responsibilities for cleaning up at the Worksite, the Owner may implement appropriate cleanup measures after two (2) business Days' notice and allocate the cost among those responsible during the following pay period.

4.7 COST OF CORRECTING DAMAGED OR DESTROYED WORK With regard to damage or loss attributable to the acts or omissions of the Owner or Others and not to the Trade Contractor, the Owner may either (a) promptly remedy the damage or loss or (b) accept the damage or loss. If the Trade Contractor incurs additional costs or is delayed due to such loss or damage, the Trade Contractor shall be entitled to an equitable adjustment in the Trade Contract Price or Trade Contract Time.

ARTICLE 5 SUBCONTRACTS

5.1 SUBCONTRACTORS The Trade Contract Work not performed by the Trade Contractor with its own forces shall be performed by Subcontractors.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE TRADE CONTRACT WORK

5.2.0 The Trade Contractor must identify all Subcontractors and suppliers within 48 hours of the published date and time for which bids must be submitted, in accordance with Iowa Code Section 8A.311, as amended by House File 646 in 2011. Subcontractors and suppliers may not be changed without the approval of the Owner. Requests for changing a Subcontractor or supplier must identify the reason for the proposed change, the name of the new Subcontractor or supplier, and the change in the subcontractor or supplier price as a result of the change. Any reduction in subcontractor or supplier price as a result of the change, if the change is approved by the Owner, shall be deducted from the Trade Contract Price via a deductive Change Order. Any such changes, if approved by the Owner, which result in an increase in the Trade Contract Price shall be borne by the Trade Contractor.

5.2.1 If the Owner has a reasonable objection to any proposed subcontractor or material supplier, the Owner shall notify the Trade Contractor in writing.

5.2.2 If the Owner has reasonably and promptly objected as provided in subsection 5.2.1, the Trade Contractor shall not contract with the proposed subcontractor or material supplier, and the Trade Contractor shall propose another Subcontractor acceptable to the Owner. To the extent the substitution results in an increase or decrease in the Trade Contract Price or Trade Contract Time, an appropriate



Trade Contract Change Order shall be issued as provided in ARTICLE 8.

5.3 BINDING OF SUBCONTRACTORS The Trade Contractor agrees to bind every Subcontractor (and require every Subcontractor to so bind its subcontractors) to all the provisions of this Agreement and the Trade Contract Documents as they apply to the Subcontractor's portion of the Trade Contract Work.

5.4 Deleted

5.5 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

5.5.1 If this Agreement is terminated, each subcontract agreement shall be assigned by the Trade Contractor to the Owner, subject to the prior rights of any surety, provided that:

5.5.1.1 this Agreement is terminated by the Owner pursuant to sections 11.3 or 11.4; and

5.5.1.2 the Owner accepts such assignment after termination by notifying the Subcontractor and Trade Contractor in writing, and assumes all rights and obligations of the Contractor pursuant to each subcontract agreement.

5.5.2 If the Owner accepts such an assignment, and the Work has been suspended for more than thirty (30) consecutive Days, following termination, if appropriate, the Subcontractor's compensation shall be equitably adjusted as a result of the suspension.

ARTICLE 6 TRADE CONTRACT TIME

6.1 PERFORMANCE OF THE TRADE CONTRACT WORK

6.1.1 DATE OF COMMENCEMENT The Date of Commencement is the date of Owner's written notice to proceed unless otherwise set forth below:

6.1.2 TIME Substantial Completion of the Trade Contract Work shall be achieved in xxx (xx) Days from the Date of Commencement. Unless otherwise specified in the Certificate of Substantial Completion, the Trade Contractor shall achieve Final Completion within 30 Days after the date of Substantial Completion, subject to adjustments as provided for in the Trade Contract Documents.

6.1.3 Time limits stated above are of the essence of this Agreement.

6.1.4 Unless instructed by the Owner in writing, the Trade Contractor shall not knowingly commence the Trade Contract Work before the effective date of insurance to be provided by the Trade Contractor and Owner as required by the Trade Contract Documents.

6.2 CONSTRUCTION SCHEDULE Prior to the commencement of the construction of the Trade Contract Work, the Trade Contractor shall submit a copy of its critical path method (CPM) construction schedule showing the completion of the Trade Contract Work within the allowable number of days identified above. The Trade Contractor shall regularly update its CPM construction schedule for the Trade Contract Work and promptly furnish the Construction Manager on an ongoing basis scheduling information requested by the Construction Manager for the Trade Contract Work. In consultation with the Trade Contractor, the Construction Manager shall incorporate the Trade Contract Work and work of other trade contractors into an overall Construction Schedule for the entire Project. The Trade Contractor shall be bound by the Construction. Nothing in this Trade Contractor Agreement shall relieve the Trade Contractor of any liability for any unexcused failure to comply with its original schedule, the Construction Schedule, or any completion dates. The Construction Manager shall have the right to coordinate the Trade Contractors, including the right, if necessary, to change the time, order and priority in which the various portions of the Trade Contract Work and the other work associated with the Project shall be performed.



6.3 DELAYS AND EXTENSIONS OF TIME

6.3.1 If the Trade Contractor is delayed at any time in the commencement or progress of the Work by any cause beyond the control of the Trade Contractor, the Trade Contractor shall be entitled to an equitable extension of the Trade Contract Time if the Trade Contractor is able to show that the critical path of the Trade Contract Work was delayed by causes beyond the control of the Trade Contractor. Examples of causes beyond the control of the Trade Contractor include, but are not limited to, the following: acts or omissions of the Owner, the Design Professional, Construction Manager or Others; changes in the Work or the sequencing of the Work ordered by the Owner, or arising from decisions of the Owner that impact the time of performance of the Work; transportation delays not reasonably foreseeable; labor disputes not involving the Trade Contractor; general labor disputes impacting the Project but not specifically related to the Worksite; fire; terrorism, epidemics, adverse governmental actions, unavoidable accidents or circumstances; adverse weather conditions not reasonably anticipated; encountering Hazardous Materials; concealed or unknown conditions; delay authorized by the Owner pending dispute resolution; and suspension by the Owner under section 11.1. The Trade Contractor shall submit any requests for equitable extensions of Contract Time in accordance with the provisions of ARTICLE 8.

6.3.2 In addition, if the Trade Contractor is able to show that it incurred additional costs because the critical path of the Trade Contract Work was delayed by acts or omissions of the Owner, the Design Professional, Construction Manager or Others, changes in the Work or the sequencing of the Work ordered by the Owner, or arising from decisions of the Owner that impact the time of performance of the Work, encountering Hazardous Materials, or concealed or unknown conditions, delay authorized by the Owner pending dispute resolution or suspension by the Owner under section 11.1, then the Trade Contractor shall be entitled to an equitable adjustment in the Trade Contract Price subject to section 6.6.

6.3.3 NOTICE OF DELAYS In the event delays to the Trade Contract Work are encountered for any reason, the Trade Contractor shall provide prompt written notice to the Owner and the Construction Manager of the cause of such delays after Trade Contractor first recognizes the delay. The Owner and Trade Contractor agree to undertake reasonable steps to mitigate the effect of such delays.

6.4 NOTICE OF DELAY CLAIMS If the Trade Contractor believes it is due an equitable extension of Trade Contract Time or an equitable adjustment in Trade Contract Price as a result of a delay described in subsection 6.3.1, the Trade Contractor shall give the Owner and the Construction Manager written notice of the claim in accordance with section 8.4. If the Trade Contractor causes delay in the completion of the Trade Contract Work, the Owner shall be entitled to recover its additional costs subject to subsection 6.6. The Owner shall process any such claim against the Trade Contractor in accordance with ARTICLE 8.

6.5 LIQUIDATED DAMAGES

6.5.1 SUBSTANTIAL COMPLETION The Owner and the Trade Contractor agree that this Agreement ☐ shall / ☒ shall not (indicate one) provide for the imposition of liquidated damages based on the Date of Substantial Completion.

6.5.1.1 The Trade Contractor understands that if the Date of Substantial Completion established by this Agreement, as may be amended by subsequent Trade Change Order, is not attained, the Owner will suffer damages which are difficult to determine and accurately specify. The Trade Contractor agrees that if the Date of Substantial Completion is not attained the Trade Contractor shall pay the Owner Zero Dollars and No Cents (\$0.00) as liquidated damages and not as a penalty for each day that Substantial Completion extends beyond the Date of Substantial Completion. The liquidated damages provided herein shall be in lieu of all liability for any and all



extra costs, losses, expenses, claims, penalties and any other damages of whatsoever nature incurred by the Owner which are occasioned by any delay in achieving the Date of Substantial Completion.

6.5.2 FINAL COMPLETION The Owner and the Trade Contractor agree that this Agreement ☐ shall / ☒ shall not (indicate one) provide for the imposition of liquidated damages based on the Date of Final Completion.

6.5.2.1 The Trade Contractor understands that if the Date of Final Completion established by this Agreement, as may be amended by subsequent Trade Change Order is not attained, the Owner will suffer damages which are difficult to determine and accurately specify. The Trade Contractor agrees that if the Date of Final Completion is not attained the Trade Contractor shall pay the Owner Zero Dollars and No Cents (\$0.00) as liquidated damages and not as a penalty for each day that Final Completion extends beyond the Date of Final Completion. The liquidated damages provided herein shall be in lieu of all liability for any and all extra costs, losses, expenses, claims, penalties and any other damages of whatsoever nature incurred by the Owner which are occasioned by any delay in achieving the Date of Final Completion.

6.5.3 OTHER LIQUIDATED DAMAGES The Owner and the Trade Contractor may agree upon the imposition of liquidated damages based on other project milestones or performance requirements. Such agreement shall be included as an exhibit to this Agreement.

6.6 LIMITED MUTUAL WAIVER OF CONSEQUENTIAL DAMAGES Except for damages mutually agreed upon by the Parties as liquidated damages in Section 6.5 and excluding losses covered by insurance required by the Trade Contract Documents, the Owner and the Trade Contractor agree to waive all claims against each other for any consequential damages that may arise out of or relate to this Agreement, except for those specific items of damages excluded from this waiver as mutually agreed upon by the Parties and identified below. The Owner agrees to waive damages including but not limited to the Owner's loss of use of the Project, any rental expenses incurred, loss of income, profit or financing related to the Project, as well as the loss of business, loss of financing, principal office overhead and expenses, loss of profits not related to this Project, loss of reputation, or insolvency. The Trade Contractor agrees to waive damages including but not limited to loss of business, loss of financing, principal office overhead and expenses, loss of profits not related to this Project, loss of bonding capacity, loss of reputation, or insolvency. The provisions of this section shall also apply to the termination of this Agreement and shall survive such termination.

6.6.1 The following items of damages are excluded from this mutual waiver: The provisions of this section shall also apply to the termination of this Agreement and shall survive such termination. The Owner and the Trade Contractor shall require similar waivers in contracts with Subcontractors and Others retained for the Project.

ARTICLE 7 TRADE CONTRACT PRICE

7.1 LUMP SUM As full compensation for performance by the Trade Contractor of the Work in conformance with the Contract Documents, the Owner shall pay the Trade Contractor the lump sum price of: XX dollars and XX cents (\$XX.XX). The lump sum price is hereinafter referred to as the Trade Contract Price, which shall be subject to increase or decrease as provided in article 8.

Lump Sum Price includes Base Bid of \$X.XX and Alternate #XX for {alternate description} for \$X.XX for a total Lump Sum Price of \$X.XX.

7.2 ALLOWANCES

7.2.1 All allowances stated in the Trade Contract Documents shall be included in the Trade Contract Price. The Owner shall select allowance items in a timely manner so as not to delay the Trade Contract



Work.

7.2.2 Allowances shall include the costs of materials, supplies and equipment delivered to the Worksite, less applicable trade discounts and including requisite taxes, unloading and handling at the Worksite, and labor and installation, unless specifically stated otherwise. The Trade Contractor's Overhead and profit for the allowances shall be included in the Trade Contract Price, but not in the allowances. The Trade Contract Price shall be adjusted by Trade Contract Change Order to reflect the actual costs when they are greater than or less than the allowances.

ARTICLE 8 CHANGES

Changes in the Trade Contract Work that are within the general scope of this Agreement shall be accomplished, without invalidating this Agreement, by Trade Contract Change Order, and Trade Contract Interim Directed Change.

8.1 TRADE CHANGE ORDER

8.1.1 The Owner may order or the Trade Contractor may request changes in the Trade Contract Work or the timing or sequencing of the Trade Contract Work that impacts the Trade Contract Price or the Trade Contract Time. All such changes in the Trade Contract Work that affect Trade Contract Time or Trade Contract Price shall in the form of a Trade Contract Change Order. Any such requests for a change in the Trade Contract Price or the Trade Contract Time shall be processed in accordance with this article 8. Trade Contract Change Orders shall be executed on the ConsensusDOCS 813 - Trade Contract Change Order (CM as Owner's Agent) with attachments as necessary.

8.1.2 The Owner, with the assistance of the Construction Manager, and the Trade Contractor shall negotiate in good faith an appropriate adjustment to the Trade Contract Price or the Trade Contract Time and shall conclude these negotiations as expeditiously as possible. Acceptance of the Trade Contract Change Order and any adjustment in the Trade Contract Price or Trade Contract Time shall not be unreasonably withheld.

8.2 TRADE CONTRACT INTERIM DIRECTED CHANGE

8.2.1 The Construction Manager may issue a written Trade Contract Interim Directed Change signed by the Owner directing a change in the Trade Contract Work prior to reaching agreement with the Trade Contractor on the adjustment, if any, in the Trade Contract Price or the Trade Contract Time.

8.2.2 The Owner, with the assistance of the Construction Manager, and the Trade Contractor shall negotiate expeditiously and in good faith for appropriate adjustments, as applicable, to the Trade Contract Price or the Trade Contract Time arising out of a Trade Contract Interim Directed Change. As the Trade Contract Changed Work is performed, the Trade Contractor shall submit its costs for such work with its application for payment beginning with the next application for payment within thirty (30) Days of the issuance of the Trade Contract Interim Directed Change. If there is a dispute as to the cost to the Owner, the Trade Contractor shall continue to perform the Trade Contract Changed Work set forth in the Trade Contract Interim Directed Change and the Owner shall pay the requirements Trade Contractor the Cost of the Work, defined in 8.3.1.3 below upon receipt of an application for payment and the Owner's (and the Architect's and construction manger's) determination that the work has been completed. The Parties reserve their rights as to the disputed amount, subject to the requirements ARTICLE 12.

8.2.3 When the Owner and the Trade Contractor agree upon the adjustment in the Trade Contract Price or the Trade Contract Time, for a change in the Trade Contract Work directed by a Trade Contract Interim Directed Change, such agreement shall be the subject of a Trade Contract Change Order. The



Trade Contract Change Order shall include all outstanding Trade Contract Interim Directed Changes on which the Owner and Trade Contractor have reached agreement on Contract Price or Contract Time issued since the last Trade Contract Change Order.

8.3 DETERMINATION OF COST

8.3.1 An increase or decrease in the Trade Contract Price or the Trade Contract Time resulting from a change in the Trade Contract Work shall be determined by one or more of the following methods:

8.3.1.1 unit prices set forth in this Agreement or as subsequently agreed;

8.3.1.2 a mutually accepted, itemized lump sum;

8.3.1.3 COST OF THE WORK Cost of the Work as defined by this subsection plus 10.0 % for Overhead and 5.0 % for profit. "Cost of the Work" shall include the following costs reasonably incurred to perform a change in the Work

8.3.1.3.1 wages paid for labor in the direct employ of the Constructor in the performance of the Work;

8.3.1.3.2 salaries of the Trade Contractor's employees when stationed at the field office to the extent necessary to complete the applicable Work, employees engaged on the road expediting the production or transportation of material and equipment, and supervisory employees from the principal or branch office performing the functions listed below;

8.3.1.3.3 cost of applicable employee benefits and taxes, including but not limited to, workers' compensation, unemployment compensation, social security, health, welfare, retirement and other fringe benefits as required by law, labor agreements, or paid under the Trade Contractor's standard personnel policy, insofar as such costs are paid to employees of the Trade Contractor who are included in the Cost of the Work in subsections .1 and .2 immediately above;

8.3.1.3.4 reasonable transportation, travel, and hotel expenses of the Trade Contractor's personnel incurred in connection with the Work;

8.3.1.3.5 cost of all materials, supplies, and equipment incorporated in the Work, including costs of inspection and testing if not provided by the Owner, transportation, storage, and handling;

8.3.1.3.6 payments made by the Trade Contractor to Subcontractors for Work performed under this Agreement;

8.3.1.3.7 cost, including transportation and maintenance of all materials, supplies, equipment, temporary facilities, and hand tools not owned by the workers that are used or consumed in the performance of the Work, less salvage value or residual value; and cost less salvage value of such items used, but not consumed that remain the property of the Trade Contractor;

8.3.1.3.8 rental charges of all necessary machinery and equipment, exclusive of hand tools owned by workers, used at the Worksite, whether rented from the Trade Contractor or Others, including installation, repair and replacement, dismantling, removal, maintenance, transportation, and delivery costs. Rental from unrelated third parties shall be reimbursed at actual cost. Rentals from the Trade Contractor or its affiliates, subsidiaries, or related parties shall be reimbursed at the prevailing rates in the locality of the Worksite up to eighty-five percent (85%) of the value of the piece of equipment;

8.3.1.3.9 cost of the premiums for all insurance and surety bonds which the Trade Contractor is



required to procure or deems necessary, and approved by the Owner including any additional premium incurred as a result of any increase in the cost of the Work;

8.3.1.3.10 sales, use, gross receipts or other taxes, tariffs, or duties related to the Work for which the Trade Contractor is liable;

8.3.1.3.11 permits, fees, licenses, tests, and royalties;

8.3.1.3.12 reproduction costs, photographs, facsimile transmissions, long-distance telephone calls, data processing costs and services, postage, express delivery charges, data transmission, telephone service, and computer-related costs at the Worksite to the extent such items are used and consumed in the performance of the Work or are not capable of use after completion of the Work;

8.3.1.3.13 all water, power, and fuel costs necessary for the Work;

8.3.1.3.14 cost of removal of all nonhazardous substances, debris, and waste materials;

8.3.1.3.15 all costs directly incurred to perform a change in the Work which are reasonably inferable from the Contract Documents for the Changed Work;

8.3.1.3.16 DISCOUNTS All discounts for prompt payment shall accrue to the Owner to the extent such payments are made directly by the Owner. To the extent payments are made with funds of the Constructor, all cash discounts shall accrue to the Constructor. All trade discounts, rebates and refunds, and all returns from sale of surplus materials and equipment, shall be credited to the Cost of the Work;

8.3.1.3.17 COST REPORTING The Trade Contractor shall maintain in conformance with generally accepted accounting principles a complete and current set of records that are prepared or used by the Trade Contractor to calculate the Cost of Work. The Owner and Construction Manager shall be afforded access to the Trade Contractor's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda and similar data relating to requested payment for Cost of the Work. The Trade Contractor shall preserve all such records for a period of three years after the final payment or longer where required by law;

8.3.1.3.18 COST AND SCHEDULE ESTIMATES The Trade Contractor shall use reasonable skill and judgment in the preparation of a cost estimate or schedule for a change to the Work, but does not warrant or guarantee their accuracy

8.3.1.4 If an increase or decrease cannot be agreed to as set forth in Clauses .1 through .3 above, and the Owner or the Construction Manager issues a Trade Contract Interim Directed Change, the cost of the change in the Trade Contract Work shall be determined by the reasonable actual expense and savings of the performance of the Work resulting from the change. If there is a net increase in the Trade Contract Price, the Trade Contractor's Fee shall be adjusted accordingly. In case of a net decrease in the Trade Contract Price, the Trade Contractor's Fee shall not be adjusted unless ten percent (10%) or more of the Project is deleted. The Trade Contractor shall maintain a documented, itemized accounting evidencing the expenses and savings.

8.3.2 If unit prices are set forth in the Trade Contract Documents or are subsequently agreed to by the Parties, but the character or quantity of such unit items as originally contemplated is so different in a proposed Trade Change Order that the original unit prices will cause substantial inequity to the Owner or the Trade Contractor, such unit prices shall be equitably adjusted.

8.4 CLAIMS FOR ADDITIONAL COST OR TIME Except as provided in subsection 6.3.2 and section 6.4 for



any claim for an increase in the Trade Contract Price or the Trade Contract Time, the Trade Contractor shall give the Owner and the Construction Manager written notice of the claim within fourteen (14) Days after the occurrence giving rise to the claim or within fourteen (14) Days after the Trade Contractor first recognizes (or should have recognized) the condition giving rise to the claim, whichever is later. Except in an emergency, notice shall be given before proceeding with the Trade Contract Work. Thereafter, the Trade Contractor shall submit written documentation of its claim, including appropriate supporting documentation, within twenty-one (21) Days after giving notice, unless the Parties mutually agree upon a period of time. The Owner or Construction Manager shall respond in writing denying or approving the Trade Contractor's claim no later than fourteen (14) Days after receipt of the Trade Contractor's claim. Any change in the Trade Contract Price or the Trade Contract Time resulting from such claim shall be authorized by Trade Contract Change Order.

ARTICLE 9 PAYMENT

9.1 GENERAL PROVISIONS Within fourteen (14) calendar Days from the date of execution of this Agreement, the Trade Contractor shall prepare and submit to the Construction Manager for approval a Schedule of Values apportioned to the various divisions or phases of the Trade Contract Work. Each line item contained in the Schedule of Values shall be assigned a monetary price such that the total of all such items shall equal the Trade Contract Price. The Schedule of Values shall be prepared in such detail and be supported by such documents and proof as may be required by the Construction Manager.

9.2 PROGRESS PAYMENTS

9.2.1 APPLICATIONS The Trade Contractor shall submit to the Construction Manager monthly notarized applications for payment. Trade Contractor's applications for payment shall be itemized and supported by the Trade Contractor's Schedule of Values and any other substantiating data as required by this Trade Contractor Agreement or requested by the Construction Manager or Design Professional. Payment applications may include payment requests on account of properly authorized Trade Contract Change Orders and Interim Directed Changes. The progress payment application shall include Trade Contract Work performed through the preceding calendar month. The Construction Manager will review the application and recommend to the Design professional and the Owner amounts payable by the Owner to the Trade Contractor. The Owner, in accordance with the determination of the Design Professional, shall pay the amount otherwise due on any payment application, less any amounts as set forth below, no later than thirty (30) calendar Days after the payment application, or portion thereof, is approved the Design Professional. The Owner may deduct, from any progress payment, such amounts as may be retained pursuant to subsection 9.2.4 below.

9.2.2 STORED MATERIALS AND EQUIPMENT Unless otherwise provided in the contract documents, applications for payment may include materials and equipment not yet incorporated into the Work but delivered to and suitably stored onsite or offsite including applicable insurance, storage and costs incurred transporting the materials to an offsite storage facility. Approval of payment applications for stored materials and equipment stored offsite shall be conditioned on submission by the Trade Contractor of bills of sale and proof of required insurance, or such other procedures satisfactory to the Owner to establish the proper valuation of the stored materials and equipment, the Owner's title to such materials and equipment, and to otherwise protect the Owner's interests therein, including transportation to the site.

9.2.3 CLAIM WAIVERS

9.2.3.1 PARTIAL CLAIMWAIVERS AND AFFIDAVITS As a prerequisite for payment, the Trade Contractor shall provide, in a form satisfactory to the Owner and the Construction Manager, partial claim waivers in the amount of the application for payment and affidavits from the Trade Contractor, and its Subcontractors, Material Suppliers for the completed Trade Contract Work.



Such waivers shall be effective upon payment. In no event shall the Trade Contractor be required to sign an unconditional waiver of claim, either partial or final, prior to receiving payment or in an amount in excess of what it has been paid.

9.2.4 RETAINAGE From each progress payment made to the Trade Contractor has the Owner shall retain FIVE (5) percent of the amount otherwise due after deduction of any amounts as provided in section 9.3 and in no event shall such percentage exceed any applicable statutory requirements of this Agreement. Retainage shall be withheld and administered in accordance with Iowa Code Chapter 572:

9.3 ADJUSTMENT OF TRADE CONTRACTOR'S PAYMENT APPLICATION The Owner or the Construction Manager, upon notification of the Design Professional, may reject or adjust a Trade Contractor payment application or nullify a previously approved Trade Contractor payment application, in whole or in part, as may reasonably be necessary to protect the Owner from loss or damage based upon the following, to the extent that the Trade Contractor is responsible therefor under this Trade Contractor Agreement:

9.3.1 the Trade Contractor's repeated failure to perform the Trade Contract Work as required by the Trade Contractor Agreement;

9.3.2 loss or damage arising out of or relating to the Trade Contractor Agreement and caused by the Trade Contractor to the Owner, or to the Construction Manager or others to whom the Owner may be liable;

9.3.3 the Trade Contractor's failure to properly pay for labor, materials, equipment or supplies furnished in connection with the Trade Contract Work;

9.3.4 nonconforming or defective Trade Contract Work which has not been corrected in a timely fashion;

9.3.5 reasonable evidence of delay in performance of the Trade Contract Work such that the work will not be completed within the Trade Contract Time, and that the unpaid balance of the Trade Contract Price is not sufficient to offset any liquidated damages or actual damages that may be sustained by the Owner as a result of the anticipated delay caused by the Trade Contractor;

9.3.6 reasonable evidence demonstrating that the unpaid balance of the Trade Contract Price is insufficient to cover the cost to complete the Trade Contract Work; and

9.3.7 third-party claims involving the Trade Contractor or reasonable evidence demonstrating that third-party claims are likely to be filed unless and until the Trade Contractor furnishes the Owner with adequate security in the form of a surety bond, letter of credit or other collateral or commitment which are sufficient to discharge such claims if established. No later than thirty (30) Days after receipt of an application for payment, the Owner or Construction Manager shall give written notice to the Trade Contractor, disapproving or nullifying it or a portion thereof, specifying the reasons for the disapproval or nullification. When the above reasons for disapproving or nullifying an application for payment are removed, payment will be made for amounts previously withheld.

9.4 PAYMENT NOT ACCEPTANCE Payment to the Trade Contractor does not constitute or imply acceptance of any portion of the Trade Contract Work.

9.5 PAYMENT DELAY If for any reason not the fault of the Trade Contractor, the Trade Contractor does not receive a progress payment from the Owner sixty (60) calendar Days after the time such payment is due, as defined in Subparagraph 9.2.1, then the Trade Contractor, upon giving within seven (7) calendar Days after written notice to the Owner, and without prejudice to and in addition to any other legal remedies, may stop its Trade Contract Work until payment of the full amount owing to the Trade Contractor has been received. The



Trade Contract Price and Trade Contract Time shall be equitably adjusted by a Trade Contract Change Order to reflect reasonable cost and delay resulting from shutdown, delay and start-up.

9.6 SUBSTANTIAL COMPLETION

9.6.1 The Trade Contractor shall notify the Owner, the Construction Manager and the Design Professional when it considers Substantial Completion of the Trade Contract Work or a designated portion to have been achieved. The Construction Manager and the Design Professional shall promptly conduct an inspection to determine whether the Trade Contract Work or designated portion can be occupied or utilized for its intended use by the Owner without excessive interference in completing any remaining unfinished Trade Contract Work by the Trade Contractor. If the Construction Manager and the Design Professional determine that the Trade Contract Work or designated portion has not reached Substantial Completion, the Design Professional, and the Construction Manager, shall promptly compile a list of items to be completed or corrected so the Owner may occupy or utilize the Trade Contract Work or designated portion for its intended use. The Trade Contractor shall promptly complete all items on the list.

9.6.2 When Substantial Completion of the Trade Contract Work or a designated portion is achieved, the Construction Manager and the Design Professional shall prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, and the respective responsibilities of the Owner and Trade Contractor for interim items such as security, maintenance, utilities, insurance and damage to the Trade Contract Work. The Owner shall assume all responsibilities for items such as security, maintenance, utilities, and insurance, and damage to the Work. The certificate shall also list the items to be completed or corrected, and establish the time for their completion or correction. The Certificate of Substantial Completion shall be submitted to the Trade Contractor for written acceptance of responsibilities assigned in the Certificate.

9.6.3 Unless otherwise provided in the Certificate of Substantial Completion, warranties required by the Trade Contract Documents shall commence on the date of Substantial Completion of the Trade Contract Work or a designated portion.

9.6.4 Uncompleted items shall be completed by the Trade Contractor by the Final Completion date set forth in the Agreement and/or Construction Schedule. The Trade Contractor may request early release of retainage in accordance with Iowa Code Section 26.13. Payment for completed work and retainage shall be made in accordance with Iowa Code Chapters 26 and 573.

9.7 PARTIAL OCCUPANCY OR USE The Owner may occupy or use completed or partially completed portions of the Trade Contract Work when (a) the portion of the Trade Contract Work is designated in a Certificate of Substantial Completion, (b) appropriate insurer(s) consent to the occupancy or use, and (c) appropriate public authorities authorize the occupancy or use. Such partial occupancy or use shall constitute Substantial Completion of that portion of the Trade Contract Work.

9.8 FINAL PAYMENT

9.8.1 APPLICATION Upon acceptance of the Trade Contract Work by the Construction Manager, and approval by the Design Professional, and upon the Trade Contractor furnishing evidence of fulfillment of the Trade Contractor's obligations in accordance with the Trade Contract Documents, the Trade Contractor shall submit its application for final payment. The Construction Manager will review the Trade Contractor's final payment application and recommend to the Design Professional and the Owner an amount payable by the Owner to the Trade Contractor. The Design Professional shall then recommend an amount to be paid by the Owner. Final payment shall be made in accordance with Iowa Code Chapters 26 and 573.



9.8.2 REQUIREMENTS Along with its application for final payment, the Trade Contractor shall furnish to the Construction Manager:

9.8.2.1 an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Trade Contract Work for which the Owner or its property or the Construction Manager or the Owner's surety might in any way be liable, have been paid or otherwise satisfied;

9.8.2.2 consent of the Trade Contractor's surety to final payment;

9.8.2.3 satisfaction of closeout procedures as may be required by the Trade Contractor Agreement;

9.8.2.4 certification (or other writing indicating) that insurance required by the Trade Contractor Agreement is and will remain in effect beyond final payment pursuant to this Trade Contractor Agreement and

9.8.2.5 other data if required by the Owner or Construction Manager, such as receipts, releases, and waivers of liens effective upon payment to the extent and in such form as may be designated by the Owner or Construction Manager. Acceptance of final payment by the Trade Contractor shall constitute a waiver of all claims by the Trade Contractor except those previously made in writing and identified by the Trade Contractor as unsettled at the time of final application for payment.

9.8.3 TIME OF PAYMENT Final payment of the balance of the Trade Contract Price, less any amount retained pursuant to subsection 9.2.4 of this Agreement, and as required by Iowa Code Chapters 26 and 573, which among other things requires that twice the amount of an Iowa Code Chapter 573 subcontractor claim be withheld from final payment, shall be made to the Trade contractor within sixty (60) Days after the Trade Contractor has submitted a complete and accurate application for final payment.

9.8.4 LATE PAYMENT INTEREST Progress payments or final payment due and unpaid under this Trade Contractor Agreement shall bear interest from the date payment is due at the statutory rate prevailing at the place of the Project.

9.9 PAYMENT USE AND VERIFICATION The Trade Contractor is required to pay for all labor, materials and equipment used in the performance of the Trade Contract Work through the most current period applicable to progress payments received. Reasonable evidence, satisfactory to the Construction Manager, may be required to show that all obligations relating to the Trade Contract Work are current before releasing any payment due on the Trade Contract Work. If required by the Construction Manager, before final payment is made for the Trade Contract Work, the Trade Contractor shall submit evidence satisfactory to the Construction Manager that all payrolls, bills for materials and equipment, and all known indebtedness connected with the Trade Contract Work, have been paid or otherwise satisfied as set forth in subsection 9.8.2.

ARTICLE 10 INDEMNITY, INSURANCE, WAIVERS AND BONDS

10.1 INDEMNITY

10.1A To the extent portions of this Article are in conflict with SF 396 (codified at Iowa Code Section 573A.5) said portions are void and unenforceable.

10.1.1 TRADE CONTRACTOR'S INDEMNITY To the fullest extent permitted by law, the Trade Contractor shall indemnify and hold harmless the Owner, the Owner's officers, directors, members,



consultants, agents and employees, from all claims for bodily injury and property damage, other than to the Work itself and other property insured under subsection 10.3.1, including reasonable attorneys' fees, costs and expenses, that may arise from the performance of the Work, but only to the extent caused by the negligent acts or omissions of the Trade Contractor, Subcontractors or anyone employed directly or indirectly by any of them or by anyone for whose acts any of them may be liable. The Trade Contractor shall be entitled to reimbursement of any defense costs paid above the Trade Contractor's percentage of liability for the underlying claim to the extent provided for under subsection 10.1.2.

10.1.2 OWNER'S INDEMNITY To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Trade Contractor, its officers, directors, members, consultants, agents, and employees, from all claims for bodily injury and property damage, other than property insured under subsection 10.3.1, including reasonable attorneys' fees, costs and expenses, that may arise from the performance of work by Owner, Design Professional or Others, but only to the extent caused by the negligent acts or omissions of the Owner, Design Professional or Others. The Owner shall be entitled to reimbursement of any defense costs paid above Owner's percentage of liability for the underlying claim to the extent provided for under subsection 10.1.1.

10.1.3 CONSTRUCTION MANAGER AND DESIGN PROFESSIONAL INDEMNITY The Owner shall cause the Construction Manager and the Design Professional to agree to indemnify and hold harmless the Owner from all claims for bodily injury and property damage, other than to the Work itself and other property insured under section 10.3, that may arise from the Construction Manager's or the Design Professional's services, but only to the extent that such claims result from the negligent acts or omissions of the Construction Manager or the Design Professional, respectively, or anyone for whose acts or omissions the Construction Manager or Design Professional, respectively, is liable. Such provisions shall be in a form no less protective of the Parties than the Construction Manager's Indemnity provided in ConsensusDocs 801 (2011) or the Design Professional's indemnity provided in ConsensusDocs 803 (2011) respectively, and shall be reasonably satisfactory to the Owner and the Trade Contractor.

10.1.4 ADJACENT PROPERTY INDEMNIFICATION To the extent of the limits of Trade Contractor's Commercial General Liability Insurance specified in subsection 10.2.1 or Zero Dollars and No Cents (\$0.00) whichever is more, the Trade Contractor shall indemnify and hold harmless the Owner against any and all liability, claims, demands, damages, losses and expenses, including attorney's fees, in connection with or arising out of any damage or alleged damage to any of Owner's existing adjacent property that may arise from the performance of the Trade Contract Work, but only to the extent of the negligent acts or omissions of the Trade Contractor, Subcontractor or anyone employed directly or indirectly by any of them or by anyone for whose acts any of them may be liable.

10.1.5 NO LIMITATION ON LIABILITY In any and all claims against the Indemnitees by any employee of the Trade Contractor, anyone directly or indirectly employed by the Trade Contractor or anyone for whose acts the Trade Contractor may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Trade Contractor under Workers' Compensation acts, disability benefit acts or other employment benefit acts.

10.2 TRADE CONTRACTOR'S INSURANCE

10.2.1 Prior to the start of the Work, the Trade Contractor shall procure and maintain in force Workers Compensation/Employers' Liability Insurance, Business Automobile Liability Insurance, and Commercial General Liability Insurance (CGL). The CGL policy shall include coverage for liability arising from premises, operations, independent contractors, products-completed operations, personal injury and



advertising injury, contractual liability, and broad form property damage. The Trade Contractor's liability policies, as required in this Subparagraph 10.2.1, shall be written on an occurrence basis with at least the following limits of liability:

10.2.1.1 Workers' Compensation- amount required by the laws of Iowa

10.2.1.2 Employers' Liability Insurance - \$500,000 or an amount required by Iowa law, whichever is greater.

10.2.1.3 Business Automobile Liability Insurance

a. \$1,000,000 Each Accident

10.2.1.4 Commercial General Liability Insurance

a. \$1,000,000 Each Occurrence b. \$2,000,000 General Aggregate c. \$1,000,000

Products/Completed Operations Aggregate d. \$1,000,000 Personal and Advertising Injury Limit

10.2.2 The Trade Contractor Must also carry and maintain Excess or Umbrella Liability coverage for the policies in subsection 10.2.1 in the amounts as listed below:

Trade Contractor Contract Amount: <\$1,000,000 - \$2 Million Umbrella or more \$1,000,000 - \$5,000,000 - \$5 Million Umbrella or more >\$5,000,000 - \$10 Million Umbrella or more

10.2.3 The Trade Contractor shall maintain in effect all insurance coverage required under subsection 10.2.1 with insurance companies lawfully authorized to do business in Iowa. Such insurance companies shall have a minimum A.M. Best Rating of A-VI (Consult instructions and insurance advisor). If the Trade Contractor fails to obtain or maintain any insurance coverage required under this Agreement, the Owner may purchase such coverage and charge the expense to the Trade Contractor, or terminate this Agreement.

10.2.4 To the extent commercially available, the policies of insurance required under Subparagraph 10.2.1 shall contain a provision that the insurance company or its designee must give the Owner written notice transmitted in paper or electronic format: (a) 30 days before coverage is nonrenewed by the insurance company and (b) with 10 business days after cancelation of coverage by the insurance company. The Trade Contractor shall maintain completed operations liability insurance for one year after acceptance of the Contract Documents, whichever is longer. Prior to commencement of services, the Trade Contractor shall furnish the Owner with certificates evidencing the required coverages. In addition, if any insurance policy required under subsection 10.2.1 is not to be immediately replaced without a lapse in coverage when it expires, exhausts its limits, or is to be, cancelled, the Trade Contractor shall give Owner prompt written notice upon actual or constructive knowledge of such condition.

10.2.5 ADDITIONAL LIABILITY COVERAGE

10.2.5.1 The Owner ☒ shall / ☐ shall not (indicate one) require the Trade Contractor to purchase and maintain liability coverage, primary to the Owner's coverage under subsection 10.3.1.

10.2.5.2 If required by subsection 10.2.5.1, the additional liability coverage required of the Trade Contractor shall be:

1. Additional Insured Owner shall be named as an additional insured on Trade Contractor's Commercial General Liability Insurance specified for operations and completed operations,



but only with respect to liability for bodily injury, property damage or personal and advertising injury to the extent caused by the negligent acts or omissions of Trade Contractor, or those acting on Trade Contractor's behalf, in the performance of Trade Contractor's Work for.

2. OCP Trade Contractor shall provide an Owners' and Contractors' Protective Liability Insurance ("OCP") policy with limits equal to the limits on Commercial General Liability Insurance specified or limits as otherwise required by Owner.

Any documented additional cost in the form of a surcharge associated with procuring the additional liability coverage in accordance with this subsection shall be paid by the Owner directly or the costs may be reimbursed by the Owner to the Trade Contractor by increasing the Trade Contract Price to correspond to the actual cost required to purchase and maintain the additional liability coverage. Prior to commencement of the Work, the Trade Contractor shall obtain and furnish to the Owner a certificate evidencing that the additional liability coverages have been procured.

10.2.6 PROFESSIONAL LIABILITY INSURANCE To the extent the Trade Contractor is required to procure design services under this Agreement, in accordance with section 3.14, the Trade Contractor shall require the designers to obtain professional liability insurance for claims arising from the negligent performance of professional services under this Agreement, with a company reasonably satisfactory to the Owner, including coverage for all professional liability caused by any of the Designer's(s') consultants, written for not less than \$1,000,000 per claim and in the aggregate with the deductible not to exceed \$2,000,000. The deductible shall be paid by the Designer.

10.3 OWNER'S INSURANCE

10.3.1 Deleted.

10.3.2 Deleted.

10.4 PROPERTY INSURANCE

10.4.1 Before the start of Trade Contract Work, the Owner shall obtain and maintain Builder's Risk Policy insurance with minimum coverage limits equal to the full cost of replacement of the Project at the time of loss. This insurance shall also name the Trade Contractor, Subcontractors, Material Suppliers, Construction Manager and Design Professional as insureds. This insurance shall be written as a Builder's Risk Policy or equivalent form to cover all risks of physical loss except those specifically excluded by the policy, and shall insure at least against the perils of fire, lightning, explosion, windstorm, hail, smoke, aircraft and vehicles, riot and civil commotion, theft, vandalism, malicious mischief, debris removal, flood (subject to sublimits), earthquake (subject to sublimits), earth movement, water damage, wind damage, testing if applicable, collapse however caused, and shall include coverage for, material, or equipment stored offsite, onsite or in transit. This policy shall provide for a waiver of subrogation in favor of the Trade Contractor, Subcontractors, Material Suppliers, Construction Manager and Design Professional. This insurance shall remain in effect until the Substantial Completion of the Work, final payment has been made or until no person or entity other than the Owner has an insurable interest in the property to be covered by this insurance, whichever is sooner. Partial occupancy or use of the Work shall not commence until the Owner has secured the consent of the insurance company or companies providing the coverage required in this Subparagraph 10.4.1.

10.4.2 If the Owner does not intend to purchase the property insurance required by this Agreement, including all of the coverages and deductibles described herein, the Owner shall give written notice to the Trade Contractor, the Design Professional and the Construction Manager before the Trade Contract



Work is commenced. The Trade Contractor may then provide insurance to protect its interests and the interests of the Subcontractors, including the coverage of deductibles. The cost of this insurance shall be charged to the Owner in a Change Order. The Owner shall be responsible for all of Trade Contractor's costs reasonably attributed to the Owner's failure or neglect in purchasing or maintaining the coverage described above.

10.4.2.1 The Owner will not obtain insurance to cover the risk of physical loss resulting from Terrorism. The Construction Manager is not required to purchase this type of insurance but may purchase this type of insurance if it chooses. If purchased, the cost of this insurance shall be borne by the Construction manager.

10.4.3 POLICIES The Owner shall provide the Trade Contractor with a copy of all policies including all endorsements upon request.

10.5 PROPERTY INSURANCE LOSS ADJUSTMENT

10.5.1 LOSS ADJUSTMENT Any insured loss shall be adjusted with the Owner and the Trade Contractor and made payable to the Owner as trustee for the insureds, as their interests may appear.

10.5.2 DISTRIBUTION OF PROCEEDS Following the occurrence of an insured loss, monies received will be deposited in a separate account and the trustee shall make distribution in accordance with the agreement of the Parties in interest.

10.6 WAIVERS

10.6.1 PROPERTY DAMAGE The Owner and Trade Contractor waive all claims and other rights they may have against each other for loss of or damage to (a) the Project, (b) all materials, machinery, equipment and other items used in accomplishing the Trade Contract Work or services or to be incorporated into the Project, while the same are in transit, at the Project Site, during erection and otherwise, and (c) all property owned by or in the custody of Owner and its affiliates, however such loss or damage shall occur, to the extent such damage is covered by property insurance. The proceeds of such insurance shall be held by the Owner as trustee.

10.6.2 WAIVER OF SUBROGATION The Owner shall have its insurers waive all rights of subrogation they may have against the Construction Manager, Design Professional, Trade Contractors, and their Subcontractors and Material Suppliers on all policies carried by the Owner on the Project and adjacent properties, including, after final payment, those policies to be provided on the completed Project not intended to insure the Project during construction.

10.6.3 ENDORSEMENT If the policies of insurance referred to in this section require an endorsement to provide for continued coverage where there is a waiver of subrogation, the Owner will cause them to be so endorsed.

10.7 RISK OF LOSS Except to the extent a loss is covered by property insurance carried by the owner, risk of loss or damage to the Work shall be upon the Trade Contractor until the Date of Final Completion, unless otherwise agreed to by the Parties.

10.8 BONDS Performance and Payment Bonds

☒ are

☐ are not

required of the Trade Contractor that meet the requirements of Iowa Code Chapter 573. A deposit in lieu of a



bond may be acceptable if it meets the requirements of Iowa Code Section 573.4. Such bonds shall be issued by a surety admitted in the State in which the Project is located and must be acceptable to the Owner. The Owner's acceptance shall not be withheld without reasonable cause. The penal sum of the Payment Bond and of the Performance Bond shall each be one hundred percent (100%) of the original Contract Price. Any increase in the Contract Price that exceeds ten percent (10%) in the aggregate shall require a rider to the Bonds increasing penal sums accordingly. Up to such ten percent (10%) amount, the penal sum of the Bond shall remain equal to one hundred percent (100%) of the Contract Price. The Trade Contractor shall endeavor to keep its surety advised of changes potentially impacting the Contract Time and Contract Price, though the Trade Contractor shall require that its surety waives any requirement to be notified of any alteration or extension of time. The Trade Contractor's Payment Bond for the Project, if any, shall be made available by the Owner for review and copying by the Subcontractor. Iowa Code Chapter 573 shall control and take precedence over any conflicting term or condition in this Agreement

ARTICLE 11 SUSPENSION, NOTICE TO CURE AND TERMINATION OF AGREEMENT

11.1 SUSPENSION BY OWNER FOR CONVENIENCE

11.1.1 OWNER SUSPENSION Should the Owner order the Trade Contractor in writing to suspend, delay, or interrupt the performance of the Trade Contract Work for such period of time as may be determined to be appropriate for the convenience of the Owner and not due to any act or omission of the Trade Contractor or any person or entity for whose acts or omissions the Trade Contractor may be liable, then the Trade Contractor shall immediately suspend, delay or interrupt that portion of the Trade Contract Work as ordered by the Owner. The Trade Contract Price and the Trade Contract Time shall be equitably adjusted by Trade Contract Change Order for the cost and delay resulting from any such suspension.

11.1.2 Any action taken by the Owner that is permitted by any other provision of the Trade Contract Documents and that results in a suspension of part or all of the Trade Contract Work does not constitute a suspension of Trade Contract Work under this section.

11.2 NOTICE TO CURE A DEFAULT If the Trade Contractor persistently refuses or fails to supply enough properly skilled workers, proper materials, or equipment to maintain the approved Construction Schedule in accordance with ARTICLE 6, or fails to make prompt payment to its workers, Subcontractors or Material Suppliers; disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction; or is otherwise guilty of a material breach of a provision of this Agreement, the Trade Contractor may be deemed in default. If the Trade Contractor fails within seven (7) business Days after receipt of written notification to commence and continue satisfactory correction of such default with diligence and promptness, then the Owner shall give the Trade Contractor a second notice to correct the default within a three (3) Day period. If the Trade Contractor fails to promptly commence and continue satisfactory correction of the default following receipt of such second notice, the Owner without prejudice to any other rights or remedies may:

11.2.1 supply workers and materials, equipment and other facilities as the Owner or Construction Manager deems necessary for the satisfactory correction of the default, and charge the cost to the Trade Contractor, who shall be liable for the payment of same including reasonable Overhead, profit and attorneys' fees;

11.2.2 contract with Others to perform such part of the Trade Contract Work as the Owner or Construction Manager determines shall provide the most expeditious correction of the default, and charge the cost to the Trade Contractor;

11.2.3 withhold payment due the Trade Contractor in accordance with section 9.3; and

11.2.4 in the event of an emergency affecting the safety of persons or property, immediately commence



and continue satisfactory correction of such default as provided in subsections 11.2.1 and 11.2.2 without first giving written notice to the Trade Contractor, but shall give prompt written notice of such action to the Trade Contractor following commencement of the action.

11.3 OWNER'S RIGHT TO TERMINATE FOR DEFAULT

11.3.1 **TERMINATION BY OWNER FOR DEFAULT** If, within seven (7) Days of receipt of a notice to cure pursuant to section 11.2, the Trade Contractor fails to commence and satisfactorily continue correction of the default set forth in the notice to cure, the Owner may notify the Trade Contractor that it intends to terminate this Agreement for default absent appropriate corrective action within fourteen additional Days. After the expiration of the additional fourteen (14) Day period, the Owner may terminate this Agreement by written notice absent appropriate corrective action. Termination for default is in addition to any other remedies available to Owner under section 11.2. If the Owner's cost arising out of the Trade Contractor's failure to cure, including the cost of completing the Trade Contract Work and reasonable attorneys' fees, exceeds the unpaid Trade Contract Price, the Trade Contractor shall be liable to the Owner for such excess costs. If the Owner's costs are less than the unpaid Trade Contract Price, the Owner shall pay the difference to the Trade Contractor. In the event the Owner exercises its rights under this section, upon the request of the Trade Contractor the Owner shall furnish to the Trade Contractor a detailed accounting of the cost incurred by the Owner.

11.3.2 **USE OF TRADE CONTRACTOR'S MATERIALS, SUPPLIES AND EQUIPMENT** If the Owner or Others perform work under this section, the Owner shall have the right to take and use any materials, supplies and equipment belonging to the Trade Contractor and located at the Worksite for the purpose of completing any remaining Trade Contract Work. Immediately upon completion of the Work, any remaining materials, supplies or equipment not consumed or incorporated in the Trade Contract Work shall be returned to the Trade Contractor in substantially the same condition as when they were taken, reasonable wear and tear excepted.

11.3.3 If the Trade Contractor files a petition under the Bankruptcy Code, this Agreement may be terminated for cause at the may be terminated for cause at the Owner.

11.3.3 If the Trade Contractor files a petition under the Bankruptcy Code, this Agreement may be terminated for cause at the may be terminated for cause at the Owner.

11.3.4 The Owner shall make reasonable efforts to mitigate damages arising from Trade Contractor default, and shall promptly invoice the Trade Contractor for all amounts due pursuant to sections 11.2 and 11.3.

11.4 TERMINATION BY OWNER FOR CONVENIENCE

11.4.1 Upon written notice to the Trade Contractor, the Owner may, without cause, terminate this Agreement. The Trade Contractor shall immediately stop the Work, follow the Owner's or Construction Manager's instructions regarding shutdown and termination procedures, and strive to minimize any further costs.

11.4.2 If the Owner terminates this Agreement pursuant to this section, the Trade Contractor shall be paid:

11.4.2.1 for the Work performed to date including Overhead and profit; and

11.4.2.2 for all demobilization costs and costs incurred as a result of the termination but not including Overhead or profit on work not performed;

11.4.2A Upon written notice to the Trade Contractor the Owner has the right to terminate this



Agreement without penalty as a result of the following: 1) the legislature or governor fail to appropriate funds sufficient to allow the Owner to operate as required and fulfill its obligations under this Agreement, 2) funds are de-appropriated or not allocated, 3) the Owner's authorization to operate is withdrawn or there is a material alteration in the programs administered by the owner, or 4) the Owner's duties are substantially modified. If such a termination results then the Trade Contractor shall be paid in the manner set forth in subparagraph 11.4.2. If, however, an appropriation to cover the cost of this Agreement becomes available within sixty (60) days subsequent to termination under this paragraph then the Owner agrees to re-enter into a modified version of this Agreement that accounts for the termination and reinstatement.

11.4.3 If the Owner terminates this Agreement pursuant to sections 11.3 or 11.4, the Trade Contractor shall:

11.4.3 If the Owner terminates this Agreement pursuant to sections 11.3 or 11.4, the Trade Contractor shall:

11.4.3.1 execute and deliver to the Owner all papers and take all action required to assign, transfer and vest in the Owner the rights of the Trade Contractor to all materials, supplies and equipment for which payment has or will be made in accordance with the Trade Contract Documents and all subcontracts, orders and commitments which have been made in accordance with the Trade Contract Documents;

11.4.3.2 exert reasonable effort to reduce to a minimum the Owner's liability for subcontracts, orders and commitments that have not been fulfilled at the time of the termination;

11.4.3.3 cancel any subcontracts, orders and commitments as the Owner or Construction Manager directs; and

11.4.3.4 sell at prices approved by the Owner or Construction Manager any materials, supplies and equipment as the Owner or Construction Manager directs, with all proceeds paid or credited to the Owner.

11.5 TRADE CONTRACTOR'S RIGHT TO TERMINATE

11.5.1 Upon seven (7) Days' written notice to the Owner and Construction Manager, the Trade Contractor may terminate this Agreement if the Trade Contract Work has been stopped for a thirty (30) Day period through no fault of the Trade Contractor for any of the following reasons:

11.5.1.1 under court order or order of other governmental authorities having jurisdiction;

11.5.1.2 as a result of the declaration of a national emergency or other governmental act during which, through no act or fault of the Trade Contractor, materials are not available; or

11.5.1.3 suspension by the Owner for convenience pursuant to section 11.1

11.5.2 In addition, upon seven (7) Days' written notice to the Owner and Construction Manager, the Trade Contractor may terminate the Agreement if the Owner:

11.5.2.1 fails to furnish reasonable evidence pursuant to section 4.1.2 that sufficient funds are available and committed for Project financing, or

11.5.2.2 assigns this Agreement over the Trade Contractor's reasonable objection, or

11.5.2.3 fails to pay the Trade Contractor in accordance with this Agreement and the Trade Contractor has complied with the notice provisions of section 9.5, or



11.5.2.4 otherwise materially breaches this Agreement.

11.5.3 Upon termination by the Trade Contractor in accordance with this section, the Trade Contractor shall be entitled to recover from the Owner payment for all Trade Contract Work executed and for any proven loss, cost or expense in connection with the Trade Contract Work, including all demobilization costs plus reasonable Overhead and profit on work not performed.

11.6 OBLIGATIONS ARISING BEFORE TERMINATION Even after termination pursuant to ARTICLE 11, the provisions of this Agreement still apply to any Trade Contract Work performed, payments made, events occurring, costs charged or incurred or obligations arising before the termination date.

ARTICLE 12 DISPUTE MITIGATION AND RESOLUTION

12.1 WORK CONTINUANCE AND PAYMENT Unless otherwise agreed in writing, the Trade Contractor shall continue the Trade Contract Work and maintain the Construction Schedule during any dispute mitigation or resolution proceedings. If the Trade Contractor continues to perform, the Owner shall continue to make payments in accordance with this Agreement.

12.2 DIRECT DISCUSSIONS If the Parties cannot reach resolution on a matter relating to or arising out of the Agreement, the Parties shall endeavor to reach resolution through good faith direct discussions between the Parties' representatives, who shall possess the necessary authority to resolve such matter and who shall record the date of first discussions. The authorized representative for the Trade Contractor is identified in Paragraph 3.4 of the Agreement. The authorized representative for the Owner is identified in Paragraph 4.2 of the Agreement. The parties' authorized representative are, among other things, authorized to resolve matters of disagreement and disputes between the Parties. If the dispute remains unresolved after fifteen (15) Days from the date of first discussion, the Parties shall submit such matter to the dispute mitigation and dispute resolution procedures selected herein.

12.3 MITIGATION The Parties agree that dispute mitigation procedures provided in this Project. Disputes remaining unresolved after direct discussions shall be directed to the selected mitigation procedure immediately below. The dispute mitigation procedure shall result in nonbinding finding on the matter. This may be introduced as evidence at a subsequent binding adjudication of the matter, as designee on Paragraph 12.5. The Parties agree that the dispute mitigation procedure shall be

(Designate only one.)

☒ Project Neutral

☐ Dispute Review Board

12.3.1 MITIGATION PROCEDURES The Project Neutral/Dispute Review Board shall be mutually selected and appointed by the Parties and shall execute a retainer agreement with the Parties establishing the scope of the Project Neutral/Dispute Review Board's responsibilities. The costs and expenses of the Project Neutral/Dispute Review Board shall be shared equally by the Parties. The Project Neutral/Dispute Review Board shall be available to either Party, upon request, throughout the course of the Project, and shall make regular visits to the Project so as to maintain an up-to-date understanding of the Project progress and issues and to enable the Project Neutral/Dispute Review Board to address matters in dispute between the Parties promptly and knowledgeably. The Project Neutral/Dispute Review Board shall issue nonbinding findings within five (5) business Days of referral of the matter to the Project Neutral, unless good cause is shown.

12.3.2 If the matter remains unresolved following the issuance of the nonbinding finding by the mitigation procedure or if the Project Neutral/Dispute Review Board fails to issue nonbinding findings



within five (5) Days of the referral, the Parties shall submit the matter to the binding dispute resolution procedure designated in section 12.5.

12.4 MEDIATION If direct discussions pursuant to section 12.2 do not result in resolution of the matter and no dispute mitigation procedure is selected under section 12.3, the Parties shall endeavor to resolve the matter by mediation through the current Construction Industry Mediation Rules of the American Arbitration Association, or the Parties may mutually agree to select another set of mediation rules. The administration of the mediation shall be as mutually agreed by the Parties. The mediation shall be convened within thirty (30) business Days of the matter first being discussed and shall conclude within forty-five (45) business Days of the matter first being discussed. Either Party may terminate the mediation at any time after the first session, but the decision to terminate shall be delivered in person by the terminating Party to the non-terminating Party and to the mediator. The costs of the mediation shall be shared equally by the Parties.

12.5 BINDING DISPUTE RESOLUTION If the matter is unresolved after submission of the matter to a mitigation procedure or to mediation, the Parties shall submit the matter to the binding dispute resolution procedure designated herein.

(Designate only one.)

☐ Arbitration using the current Construction Industry Arbitration Rules of the American Arbitration Association

☒ Litigation in either the state or federal court having jurisdiction of the matter in the location of the Project.

12.5.1 The costs of any binding dispute resolution procedures shall be borne by the non-prevailing Party, as determined by the adjudicator of the dispute. However, the costs of binding dispute resolution does not include attorney fees. The Parties are each responsible for paying for their own attorney fees.

12.5.2 VENUE The venue of any binding dispute resolution procedure shall be Des Moines, Iowa.

12.6 MULTIPARTY PROCEEDING All parties necessary to resolve a claim shall be parties to the same dispute resolution proceeding. Appropriate provisions shall be included in all other contracts relating to the Work to provide for the joinder or consolidation of such dispute resolution procedures.

12.7 LIEN RIGHTS The Trade Contractor acknowledges that it has no mechanic's lien rights on this Project because it is a public improvement project.

ARTICLE 13 MISCELLANEOUS PROVISIONS

13.1 ASSIGNMENT Neither the Owner nor the Trade Contractor shall assign their interest in this Agreement without the written consent of the other except as to the assignment of proceeds. The terms and conditions of this Agreement shall be binding upon both Parties, their partners, successors, assigns and legal representatives. Neither Party to this Agreement shall assign the Agreement as a whole without written consent of the other. If either Party attempts to make such an assignment, that Party shall nevertheless remain legally responsible for all obligations under this Agreement, unless otherwise agreed by the other Party.

13.2 GOVERNING LAW This Agreement and all disputes arising there from shall be governed by the Iowa law.

13.3 SEVERABILITY The partial or complete invalidity of any one or more provisions of this Agreement shall not affect the validity or continuing force and effect of any other provision.



13.4 NO WAIVER OF PERFORMANCE The failure of either Party to insist, in any one or more instances, on the performance of any of the terms, covenants or conditions of this Agreement, or to exercise any of its rights, shall not be construed as a waiver or relinquishment of such term, covenant, condition or right with respect to further performance or any other term, covenant, condition or right.

13.5 TITLES AND GROUPINGS The titles given to the articles of this Agreement are for ease of reference only and shall not be relied upon or cited for any other purpose. The grouping of the articles in this Agreement and of the Owner's specifications under the various headings is solely for the purpose of convenient organization and in no event shall the grouping of provisions, the use of sections or the use of headings be construed to limit or alter the meaning of any provisions.

13.6 ASSISTANCE OF COUNSEL AND INTERPRETATION The Parties agree that they had the opportunity to obtain the assistance of counsel in reviewing the Agreement terms prior to execution. This Agreement shall be construed neither against nor in favor of either Party, but shall be construed in a neutral manner.

13.7 RIGHTS AND REMEDIES The Parties' rights, liabilities, responsibilities and remedies with respect to this Agreement, whether in contract, tort, negligence or otherwise, shall be exclusively those expressly set forth in this Agreement.

13.8 ADDITIONAL PROVISIONS (Insert here other provisions, if any, that pertain to this Agreement See Below.)

13.9 COMPLIANCE WITH LAW AND REGULATIONS The Trade Contractor shall comply with all applicable federal, state, and local laws, rules, ordinances, regulations and orders when performing services and/or performing work under this Agreement, including without limitation, all laws applicable to the prevention of discrimination in employment and the use of targeted small businesses as subcontractors or suppliers. The Trade Contractor declares that it has complied with all federal, state and local laws regarding business permits and licenses that may be required to provide the services and work required by this Agreement. The Trade Contractor further acknowledges that if this Project is a recipient of Federal financial assistance that it may be subject to requirements of Federal Acts and Executive Orders as mandated by Federal agencies having authority and jurisdiction to enforce and ensure compliance with such laws and regulations including, but not necessarily limited to, the Davis Bacon Act and other Federal Acts and Executive Orders.

13.10 EMPLOYMENT PRACTICES: It is the intent of the Iowa Department of Administrative Services to assure equal employment opportunity in all contract work as required by law. Vendors, are required to take affirmative action to ensure that applicants employed or seeking employment with them are treated equally as required by law. Vendors shall not illegally discriminate against any employee. During the course of the Project, the Vendor may be required to show compliance with the EEO and Affirmative Action requirements. Noncompliance with the provisions set forth at the time of contract award may result in termination or suspension of the Agreement in whole or in part. All vendors and service providers working under the terms of this Agreement are prohibited from engaging in discriminatory employment practices forbidden by Iowa law. Vendors shall complete and submit the Nondiscrimination Clause form for the Owner's approval.

13.11 RECIPROCAL BIDDER PREFERENCE In accordance with Iowa Code Section 73A.21, as amended in 2011 by HF 648, if the Trade Contractor is not a resident bidder of Iowa, as defined by law, then the Trade Contractor must specifically identify in writing with its bid any and all preferences or preferential treatment (including preferences related to labor) enforced by the state or foreign country in which the Trade Contractor is a resident. If the low bid Trade Contractor is not a resident bidder of Iowa and the Trade Contractor's foreign State of residence enforces such a preference then the Owner shall reciprocally enforce the preference in favor of a resident bidder of Iowa. Failure on the part of the Trade Contractor to completely and accurately abide by this legal requirement may, among other things, result in civil penalties and void this Agreement. The Trade Contractor should contact its attorney regarding this legal requirement if the Trade



Contractor has questions regarding its meaning or application.

13.12 LABOR RELATIONS The Trade Contractor shall comply with all Iowa and Federal labor laws. In accordance with Executive Order Number 69, issued by the Governor of Iowa on or about January 14, 2011, no project labor agreement (also known as a PLA), or similar, will be used on this Project. Iowa is a right to work state. No consultant, contractor, or employee shall be obligated to contract with or join any labor organization as a condition of performing work on this Project.

ARTICLE 14 TRADE CONTRACT DOCUMENTS

14.1 The Trade Contract Documents in existence at the time of execution of this Agreement are as follows:

RFBXXXXXXXXX Bid Package X

14.2 INTERPRETATION OF TRADE CONTRACT DOCUMENTS

14.2.1 The drawings and specifications are complementary. If Trade Contract Work is shown only on one but not on the other, the Trade Contractor shall perform the Trade Contract Work as though fully described on both consistent with the Trade Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

14.2.2 In case of conflicts between the drawings and specifications, the specifications shall govern. In any case of omissions or errors in figures, drawings or specifications, the Trade Contractor shall immediately submit the matter to the Owner for clarification. The Owner's clarifications are final and binding on all Parties, subject to an equitable adjustment in Trade Contract Time or Price pursuant to ARTICLE 6 and ARTICLE 7 or dispute resolution in accordance with ARTICLE 12.

14.2.3 Where figures are given, they shall be preferred to scaled dimensions.

14.2.4 Any terms that have well-known technical or trade meanings, unless otherwise specifically defined in this Agreement, shall be interpreted in accordance with their well-known meanings. This Agreement entered into as of the date entered in ARTICLE 1.

14.2.5 PRECEDENCE In case of any inconsistency, conflict or ambiguity among the Trade Contract Documents, the documents shall govern in the following order: (a) Trade Contract Change Orders and written amendments to this Agreement; (b) this Agreement; (c) subject to subsection 14.2.2 the drawings, specifications and addenda issued prior to the execution of this Agreement; (d) approved submittals; (e) information furnished by the Owner pursuant to subsection 4.1.3; (f) other documents listed in this Agreement. Among all the Trade Contract Documents, the term or provision that is most specific or includes the latest date shall control. Information identified in one Trade Contract Document and not identified in another shall not be considered to be a conflict or inconsistency.

This Agreement entered into as of the date entered in ARTICLE 1.

OWNER State of Iowa, Department of Administrative Services



Trade Contractor: *Contractor Name*

By: _____

(Authorized Representative)

Name:

Title:

Date:

Owner: State of Iowa - DAS

By: _____

(Authorized Representative)

Name:

Title:

Date:

END OF DOCUMENT.



SECTION 00 6000

PERFORMANCE AND PAYMENT BOND

PART 1 - GENERAL

1.01 PERFORMANCE AND PAYMENT BOND

- A. Performance and payment bonds to be used on this project, ConsensusDocs 260 and 261 are attached for reference following this page. ConsensusDocs performance and payment bonds are not required (other standard forms are acceptable to the State of Iowa).

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION



CONSENSUSDOCS 260 PERFORMANCE BOND

This document was developed through a collaborative effort of organizations representing a wide cross-section of the design and construction industry. The organizations endorsing this document believe it represents a fair allocation of risk and responsibilities for all project participants.

Endorsing organizations recognize that this document must be reviewed and adapted to meet specific needs and applicable laws. This document has important legal and insurance consequences. You are encouraged to consult legal, insurance and surety advisors before completing or modifying this document. The software includes a notes section indicating where information is to be inserted to complete this document. Further information and endorsing organizations' perspectives are available at www.consensusdocs.org/guidebook.

For Use with ConsensusDOCS 200, Standard Form of Agreement and General Conditions Between Owner and Constructor (Where the Contract Price is a Lump Sum) and ConsensusDOCS 500, Standard Agreement and General Conditions Between Owner and Construction Manager.

The Owner, _____, (the "Owner") and the Constructor, _____, (the "Constructor") have entered into a Contract (the "Contract") dated _____ for _____ (the "Project"). The Contract is incorporated by reference into this Performance Bond (the "Bond").

By virtue of this Bond, the Constructor as Principal and _____ as Surety ("Surety"), are bound to the Owner as Obligatee in the maximum amount of _____ Dollars (\$ _____) (the "Bond Sum"). The Constructor and Surety hereby bind themselves, their heirs, executors,

IMPORTANT: A vertical line in the margin indicates a change has been made to the original text. Prior to signing, recipients may wish to request from the party producing the document a "redlined" version indicating changes to the original text. Consultation with legal and insurance counsel and careful review of the entire document are strongly encouraged.

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administrators, successors and assigns, jointly and severally, as provided herein.

1. **GENERAL CONDITIONS** It is the condition of this Bond that if the Constructor performs its Contract obligations (the "Work"), the Surety's obligations under this Bond are null and void. Otherwise the Surety's obligations shall remain in full force and effect. The Surety waives any requirement to be notified of alterations or extensions of time made by the Owner in the Contract. The Owner may not invoke the provisions of this Bond unless the Owner has performed its obligations pursuant to the Contract. Upon making demand on this Bond, the Owner shall make the Contract Balance (the total amount payable by the Owner to the Constructor pursuant to the Contract less amounts properly paid by the Owner to the Constructor) available to the Surety for completion of the Work.

2. **SURETY OBLIGATIONS** If the Constructor is in default pursuant to the Contract and the Owner has declared the Constructor in default, the Surety promptly may remedy the default or shall

a. Complete the Work, with the consent of the Owner, through the Constructor or otherwise,

b. Arrange for the completion of the Work by a Constructor acceptable to the Owner and secured by performance and payment bonds equivalent to those for the Contract issued by a qualified surety. The Surety shall make available as the Work progresses sufficient funds to pay the cost of completion of the Work less the Contract Balance up to the Bond Sum, or

c. Waive its right to complete the Work and reimburse the Owner the amount of its reasonable costs, not to exceed the Bond Sum, to complete the Work less the Contract Balance.

3. **DISPUTE RESOLUTION** All disputes pursuant to this Bond shall be instituted in any court of competent jurisdiction in the location in which the Project is located and shall be commenced within two years after default of the Constructor or Substantial Completion of the Work, whichever occurs first. If this provision is prohibited by law, the minimum period of limitation available to sureties in the jurisdiction shall be applicable.

This Bond is entered into as of _____.

SURETY _____ (seal)

By:

Print Name: _____

Print Title: _____

(Attach Power of Attorney)

Witness:

CONSTRUCTOR _____ (seal)

By:

Print Name: _____

Print Title: _____

Witness:

(Additional signatures, if any, appear on attached page)



CONSENSUSDOCS 261 PAYMENT BOND

This document was developed through a collaborative effort of organizations representing a wide cross-section of the design and construction industry. The organizations endorsing this document believe it represents a fair allocation of risk and responsibilities for all project participants.

Endorsing organizations recognize that this document must be reviewed and adapted to meet specific needs and applicable laws. This document has important legal and insurance consequences. You are encouraged to consult legal, insurance and surety advisors before completing or modifying this document. The software includes a notes section indicating where information is to be inserted to complete this document. Further information and endorsing organizations' perspectives are available at www.consensusdocs.org/guidebook.

For Use with ConsensusDOCS 200, Standard Form of Agreement and General Conditions Between Owner and Constructor (Where the Contract Price is a Lump Sum) and ConsensusDOCS 500, Standard Agreement and General Conditions Between Owner and Construction Manager.

The Owner, _____, (the "Owner")
and the Constructor, _____,
(the "Constructor") have entered into a Contract (the "Contract") dated _____ for
_____ (the "Project"). The Contract is
incorporated by reference into this Payment Bond (the "Bond").

By virtue of this Bond, the Constructor as Principal and _____ as
Surety ("Surety"), are bound to the Owner as Obligatee in the maximum amount of
_____ Dollars (\$ _____) (the
"Bond Sum"). The Constructor and Surety hereby bind themselves, their heirs, executors,

administrators, successors and assigns, jointly and severally, as provided herein.

1. **GENERAL CONDITIONS** It is the condition of this Bond that if the Constructor promptly makes payment of all sums for all labor, materials, and equipment furnished for use in the performance of the work required by the Contract, the Surety's obligations pursuant to this Bond are null and void. Otherwise the Surety's obligations shall remain in full force and effect. The Surety waives any requirement to be notified of alterations or extensions of time made by the Owner in the Contract.

2. **SURETY OBLIGATION** Every Claimant who has not been paid in full before the expiration of a period of ninety (90) Days after such Claimant provided or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, may have a right of action on this Bond. The Surety's obligation to the Claimant(s) shall not exceed the Bond Sum.

3. **LIMITATION OF ACTION** No suit or action shall be commenced on this Bond by any Claimant

a. Unless Claimant, other than one having a direct Contract with the Constructor, shall have given written notice to the Constructor, the Owner and the Surety within ninety (90) Days after the Claimant provided or performed the last of the work or labor, or furnished the last of the materials for which the claim is made, stating with substantial accuracy the amount claimed and the name of the Party to whom the materials were furnished, or for whom the work or labor was provided or performed. Such notice shall be served by any means which provides written third party verification of delivery to the Constructor at any place it maintains an office or conducts business, or served in any manner in which legal process may be served in the state in which the Project is located.

b. After the expiration of one (1) year from the date on which the Claimant last performed labor or furnished materials or equipment on the Project. If this provision is prohibited by law, the minimum period of limitation available to sureties in the jurisdiction shall be applicable.

c. Other than in any court of competent jurisdiction in the location in which the Project is located.

4. **CLAIMANT** A Claimant is defined as an individual or entity having a direct contract with the Constructor or having a contract with a subcontractor having a direct contract with the Constructor to furnish labor, materials or equipment for use in the performance of the Contract.

This Bond is entered into as of _____.

SURETY _____ (seal)

By:

Print Name: _____

Print Title: _____

(Attach Power of Attorney)

Witness:

CONSTRUCTOR _____ (seal)

By:

Print Name: _____

Print Title: _____

Witness:

(Additional signatures, if any, appear on attached page)

IMPORTANT: A vertical line in the margin indicates a change has been made to the original text. Prior to signing, recipients may wish to request from the party producing the document a "redlined" version indicating changes to the original text. Consultation with legal and insurance counsel and careful review of the entire document are strongly encouraged.

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SECTION 01 1200

CONTRACT SUMMARY

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Project Information
- B. Project Summary
- C. Bid Scope Summary
- D. Work Hour Restrictions
- E. Access to Site
- F. Coordination with Occupants
- G. Rules for Construction Workers
- H. Bid Package Instructions

1.02 PROJECT INFORMATION

- A. Facility Name/Location: Lucas Building 321 E 12th St., Des Moines, Iowa 50319
- B. DAS Project #: 9358.00
- C. Owner: State of Iowa, Department of Administrative Services, Hoover State Office Building, Level 3, 1305 East Walnut Street, Des Moines, IA 50319
- D. Owner's Representative: Jennifer Kleene, Iowa Department of Administrative Services, 109 SE 13th Street, Des Moines, IA 50319
- E. Construction Manager: Travis Hoyle, DCI Group, 220 SE 6th St. Suite 200, Des Moines, IA 50309

1.03 PROJECT SUMMARY

- A. The project includes the replacement of CRAC units for ICN
- B. Target date to provide substantial completion is June 6th, 2025.

1.04 BID SCOPE SUMMARY

- A. Scope Applicable to All Bid Packages:
 - 1. The Contractor's Work includes all labor, supervision, materials, equipment, services, supplies, tools, facilities, transportation, hoisting, storage, receiving, licenses, inspections, certifications, overhead, profit, or other items required or reasonably inferable to properly and timely perform and complete all work and services to be performed by the Contractor pursuant to this Agreement. Unless specifically stated otherwise, incidental work required to accomplish the work of this Bid Package shall be included in the bid. This would include, but not be limited to, temporary facilities, protection of the work, security of equipment, materials, and work in progress, etc. Contractor's Work shall be performed in accordance with the Drawings, Specification Divisions 00 and 01, and Specification sections applicable to each Contractor's scope.
 - 2. Contractor is responsible for all labor and equipment to unload, account for all material delivered, stock, and delivery for this scope of work. Storage and delivery of materials and equipment at the Site shall be permitted only to the extent approved in advance by the Construction Manager, and if anything, so stored obstructs the progress of any portion of the work, it shall be promptly removed or relocated by the Contractor without reimbursement.
 - 3. On-site supervision by Prime Contractor at all times work by that contractor or their subcontractors/suppliers is taking place.
 - 4. Provide all temporary facilities required for this scope of work including trailer, trailer power, telephone, secured storage, temporary power for work, temporary and task

lighting for work, etc. as determined necessary by Contractor. Coordinate location of trailers, material storage and utility lines with Construction Manager. Limited space is available, and permission to bring any such facility or excess materials on to the site shall be approved by the Construction Manager.

5. Contractor shall provide all equipment and tools for Contractor's own cleanup. Clean up shall be done at end of every shift or more frequently if required for the Contractor to perform their work, for other Contractors to perform their work, as required by the Owner's operations, and at the discretion of the Construction Manager.
6. All turf, landscaping, and subgrade disturbances caused by equipment traffic or other activities related to the Contractor's scope shall be repaired or restored to proper conditions by the Contractor.
7. Protect adjacent existing building elements from damage from Scope of work. Repair existing building elements damaged during Contractor's Scope of work.

1.05 WORK HOUR RESTRICTIONS

- A. Work hours are from 7:00 AM to 5:00 PM, Monday through Friday unless arrangements are made in advance.

1.06 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and Owner:
 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 2. Do not obstruct roadways, sidewalks, or other public ways without permission of Owner and permit if required.
- C. Facility will be occupied at all times during duration of work. Contractor personnel shall conduct themselves in an agreeable manner at all times. Failure to do so may result in removal from the work site.

1.07 OWNER OCCUPANCY

- A. Owner intends to occupy the Project throughout construction.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.08 RULES FOR CONSTRUCTION WORKERS

- A. The staff of the State of Iowa has a responsibility to protect the public by providing a secure environment. All work site rules must be followed to the letter, at all times.
- B. All construction workers must have a background check completed prior to entering the campus to perform work.
- C. Hot Work Permit Processes and Fire Watch, when necessary, will be adhered to for this project.
- D. All State properties are tobacco free. No smoking will be permitted or tolerated on campus unless in designated areas.
- E. You are permitted access only to the work site and no other area of the institution.
- F. No drugs, alcohol, or firearms are allowed on the work site.
- G. Do not leave money, drugs, alcohol, or firearms in your personal vehicle.
- H. Company and personal vehicles are to be parked and locked in designated or authorized area of the work.
- I. Secure all tools at the end of the day.
- J. Maintain control of all tools, supplies, and debris at all times during the work.
- K. All delivery vehicles must go directly to the job site. Extra time should be anticipated for all deliveries. Provide 24-hour notice to the facility of deliveries.

- L. During an emergency, follow the instructions of the security staff.

1.09 BID PACKAGE INSTRUCTIONS

- A. **Bid Package #01 – CRAC Unit Replacement:** Trade Contractor shall include all of the following, but not limited to, as part of the contract:
 - 1. Includes specifications: 230513, 230529, 230553, 230593, 230719, 230800, 232300, 238123.12
 - 2. This contractor shall be responsible for the replacement of the ICN CRAC units as outlined in the contract documents which includes but is not limited to demo of existing units and accessories, new AC and condensing units, controls, piping and accessories, structural modifications, and 48" tall louvered screen wall enclosure.
 - 3. This contractor shall be responsible for providing dumpster service for demoed materials. Final placement of the dumpster will need to be coordinated with the owner and Construction Manager
 - 4. This contractor shall remove all hydronic piping associated with existing CRAC units. This includes but is not limited to, existing dry coolers, pumps and piping accessories for dry coolers, existing piping in the mechanical spaces below and piping in the shaft as shown in the contract documents.
 - 5. The contractor is responsible for patching back and sealing existing EPDM roof penetrations that result from removing dry coolers off the roof.
 - 6. Contractor is response for removing existing CRAC Units from Work Room LG48, this includes all piping, hangers and supports and thermostats associated with this equipment. Condensate piping is to remain.
 - 7. This contractor shall supply and install new CRAC, outdoor condensing units and controls as outlined in the contract documents.
 - 8. This contractor shall be responsible for removing and replacing ceiling and floor tiles as required for the work indicated in the contract documents. The contractor is responsible for any damaged tiles/grid that need to be replaced.
 - 9. CRAC units will need to be replaced one at a time dure to continuous use of the space. The contractor shall provide temporary cooling as required for the duration of the project.
 - 10. The contractor shall provide and install three new remote temperature sensors positions by owner in locations withing room LG48 as required.
 - 11. The contractor shall run refrigerants from condensing units to drop down into pate model PCA-5 pipe curb or approved equal. Route roof mounted refrigerant lines from CU-3 under adjacent unit so as to not interfere with maintenance clearances.
 - 12. The contractor shall route refrigerant lines through the corridor ceiling before dropping under floor at server room to connect to the indoor units.
 - 13. This contractor shall provide structural steel beams as noted for the new rooftop unit locations on top of dock roof. Contractor shall cut and replace existing bridging in kind following new steel beam erection. New diagonal bridging shall be installed at locations where distance from new beam to adjacent existing joist is greater than 16". New horizontal bridging shall be installed at locations where distance from new beam to adjacent existing joist is less than 16"
 - 14. This contractor shall provide and install louvered screen wall, sliding door, and necessary mounting brackets and hardware as outlined in the contract documents. All steel framing shall be galvanized and visible steel elements to be painted.
 - 15. This contractor shall patch existing roofing and boots as necessary on the dock roof.
- B. **Bid Package #02 – Electrical:** Trade Contractor shall include all the following, but not limited to, as part of the contract:
 - 1. Includes specifications: 260500, 260519, 260526, 260529, 260533.13, 260533.16, 260553, 262726, 262813, 262816.16.
 - 2. This contractor shall be responsible for all electrical work outlined in the contract documents which includes but is not limited to demolition, new electrical equipment, conduit, breakers, and wiring.

3. This contractor shall be responsible for the removal of existing electrical connections, conduit and conductors to water cooled condensing units on the roof. This includes removal of existing disconnects, starters, motor connections and conductors to dry cooler racks in the mechanical penthouse space.
 4. The contractor shall install new disconnects and fuses to match MOCP rating of CRAC units. Disconnects shall be installed per code and in an accessible location, coordinate the exact locations with the owner.
 5. Install bus taps in existing panels as outlined in the contract documents. These shall be installed on panel "SW" before panel "ET2". Downtime shall be at separate times. Limit the downtime for panels to a maximum of 15 minutes. Coordinate the shutdown/downtime of each panel with owner and construction manager a minimum of two weeks ahead of installation.
 6. This contractor shall provide conduit for power connections for new outdoor units. These shall be routed in parallel with refrigerant lines through the corridor ceiling as shown in the contract documents.
- C. **Alternate #01 –Temporary Cooling Provided By Others:** Trade Contractor shall remove all of the following, but not limited to, as part of the contract:
1. This contractor shall remove the cost for temporary cooling out of the scope for the duration of the project. The owner will procure and provide temporary cooling as necessary for the duration of the project.
 2. Execute accepted alternates under the same conditions as other work of the Contract.
- D. **Work Performed by Owner:** ICN will perform the following work items:
1. Relocate all moveable furniture, fixtures and equipment (FF&E), including window treatments; and personal materials from each sequenced work area prior to demolition and construction activities and after new construction is completed.

END OF SECTION

SECTION 01 2500

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Substitution Procedures
- B. Request for Substitution form

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Where the Bidding Documents stipulate a specific product be provided by naming one or more manufacturer and model, a substitute product will be considered when written request is received by the date and time identified in Section 00 1113 NOTICE TO BIDDERS. Substitution requests will be considered for all products, even if the specification does not include a statement such as “or equal,” “equal to,” “equivalent to,” or “basis of design,” unless noted otherwise.
- B. References in the Bidding Documents to brand or trade names are intended to illustrate the general characteristics of the item and not to limit competition unless noted otherwise.
- C. The written request shall be on the “Request for Substitution” form included in the Project Manual. If no such form is included, the request shall be provided on the letterhead of the company making the request.
- D. Substitution requests received after the specified date will be viewed in the context of a Change Order to the Contract, and consideration will only be given in the event a product becomes unavailable or not practical due to no fault of the Contractor, or the substitution is substantially to the Owner’s advantage (equal product for less cost or higher quality product at no change in Contract Sum).
- E. Document each substitution request with complete data substantiating compliance of the proposed substitution with the Bidding Documents. Each request shall identify the specified product for which the substitution is requested, and shall clearly describe the product for which approval is requested. The burden shall be on the requester to demonstrate the proposed substitute product’s suitability for use in the Work and its equivalency or superiority in function, appearance, quality, and performance with the product named in the Bidding Documents.
- F. A description of any changes to the Bidding Documents that the proposed substitution will require shall be included with the request. The requester shall affirm that dimensions shown on the Drawings will not be affected by the substitute product, and that it will have no adverse effect on other trades, the construction schedule, or specified warranty requirements. The request for use of a substitute product shall be signed by an authorized representative of the firm submitting the request, who shall state that the firm will pay for any changes to the building design, including Design Professional’s design, detailing, and construction cost caused by the requested substitution if the substitution is approved for use in the Work.
- G. All such substitute products approved for use in the Work during the established period of time before receipt of Bids will be identified in a subsequent Addendum to the Bidding Documents.

3.02 REQUEST FOR SUBSTITUTION FORM

- A. A Request for Substitution Form is attached following this page.
- B. Substitution requests shall be emailed to the Issuing Officer at the email address provided in Instructions to Bidders Section 1.04.

END OF SECTION

SUBSTITUTION REQUEST FORM

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: _____
Re: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

☐ Point-by-point comparative data prepared by contractor and attached - REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
_____ Date Installed: _____

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

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST FORM

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments: _____

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 3300.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by: _____

Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

SECTION 01 2600

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Change procedures

1.02 CHANGE PROCEDURES

- A. The Design Professional will advise of minor changes in the work not involving an adjustment to Contract Sum/Price or contract time as authorized.
- B. The Construction Manager may issue a Proposal Request that includes a detailed description of a proposed change with supplementary or revised drawings and specifications and a change in contract time for executing the change as provided by the Design Professional. The Trade Contractor will prepare and submit an estimate within 7 calendar days. Estimates shall be provided for the project at no cost, regardless of acceptance or rejection of proposal.
- C. The Trade Contractor may propose changes by submitting a Request for Information to the Construction Manager, describing the proposed change and its full effect on the work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and contract time with full documentation and a statement describing the effect on work by separate or other contractors. Document any requested substitutions in accordance with the specifications. Construction Manager will forward the Request for Information on to the Design Professional for their official response.
- D. Stipulated Sum/Price Change Order: Based on executed Change Order and contractor's fixed price quotation.
- E. Unit Price Change Order: The change order will be executed on a fixed unit price basis for pre-determined unit prices and quantities. Changes in contract price or contract time will be computed as specified for time and material change orders.
- F. Time and Material Change Order: The change order will be executed on a not to exceed basis. Design professional and Construction Manager will determine the not to exceed estimated cost based on contractor's proposal for hourly rates and material costs. Maintain detailed records of work done on time and material basis. Time and Material tickets must be submitted daily to the Construction Manager for verification. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the work. Submit itemized account and supporting data after completion of change. A final deductive change order will be issued to reconcile final cost to the initial change order.
- G. Change Order Forms: CONSENSUSDOC Forms provided by Owner.
- H. Execution of Change Orders: The Construction Manager will issue change orders for signature of parties as provided in the Conditions of the Contract.
- I. With respect to pricing change orders, the percentage mark-up for overhead and profit is subject to the following limits:
 - 1. Fifteen (15) percent maximum for work directly performed by employees of the Constructor, Subcontractor or Sub-subcontractor.
 - 2. Five (5) percent maximum for work performed or passed through by a Subcontractor and passed through to the Owner by the Constructor.
 - 3. Five (5) percent maximum Subcontractor's mark-up for Work performed by a Sub-Subcontractor and passed through to the Owner by the Subcontractor and Constructor.
 - 4. The maximum allowable mark-up shall be twenty-five (25) percent passed through to the Owner by the Constructor under any circumstances. Overhead and profit shall be shown separately for the Constructor and each Subcontractor of any tier performing the Change Order Work.
- J. Contractor and subcontractor agree to provide and require all suppliers to provide, a detailed breakdown of labor, labor burden, materials, installation, rental, and fuel costs.

- K. Please refer to Article 8 of CONSENSUSDOCS 802- STANDARD FORM OR AGREEMENT BETWEEN OWNER AND TRADE CONTRACTOR for additional Change Procedures.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01 2900

PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Schedule of values
- B. Application for payment

1.02 SCHEDULE OF VALUES

- A. Coordination: Trade Contactor will coordinate preparation of the Schedule of Values with preparation of the Construction Manager's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets, Submittals Schedule, and Construction Manager's Construction Schedule.
 - 2. Submit original Schedule of Values in Procore within 14 days after date of Owner-Trade Contractor Agreement. Schedule of Values must be approved by Owner prior to submission for first application for payment.
- B. Format: Utilize the Table of Contents of this project manual. Identify each line item with number and title of the major specification section. Each major specification section should be further itemized by materials cost, labor cost and subcontractor cost for each building separately for the base bid and all accepted alternates. Identify site mobilization, bonds and insurance and include a line item for closeout paperwork for a value of no less than 1% of the total contract value or \$1,000, whichever is greater.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name and address of Owner, Trade Contractor, Construction Manager and Design Team.
 - c. DAS Project Number.
 - d. Date of Submittal.
 - 2. Revise the Schedule of Values to list approved Change Orders with each Application for Payment.

1.03 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications for payments as certified by the Design Professional and paid for by Owner.
 - 1. Application for Payment at time of Substantial Completion and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement. Progress payments shall be submitted to the Construction Manager. Any request for payment for work completed prior to June 30th of any year needs to be submitted by July 15th of the same calendar year.
- C. Payment Application Forms: Use AIA form G702 and G703 as the form for the Application for Payment or an equivalent approved by the owner.
- D. Include lien waiver forms required by the owner when applicable.
- E. Application Preparation: Complete every entry on form. Construction Manager will return incomplete applications without action.
 - 1. Include amounts of Change Orders issued before last day of construction period covered by application.

- F. Waivers of Mechanic's Lien: If requested by Owner with each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment when applicable.
 - 1. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 2. Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede submittal of first Application for Payment include the following:
 - 1. Schedule of Values
 - 2. Certificates of insurance and insurance policies.
 - 3. Lists of vendors and any subcontractors.
- H. Application for Payment at Substantial Completion: After the Certificate of Substantial Completion has been fully executed, submit an Application for Payment showing 100 percent completion for the portion of the Work claimed as substantially complete, not including the closeout paperwork line item.
 - 1. Include documentation supporting the claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 - 6. AIA Document G707, "Consent of Surety to Final Payment."
 - 7. Letter of Notification to all sub-contractors and suppliers of application for release of retainage.
 - 8. Evidence that claims have been settled.
- J. Payments will be made to the extent of the value of the work performed in the previous month less a retainage amount of 5% of the value of the work performed. Upon substantial completion for the entire work, a sum sufficient to decrease the total retained to 5% of the contract sum, plus the full amount of the line item for closeout paperwork, plus such other retainage as the engineer shall determine for all incomplete work and unsettled claims will be authorized. The closeout paperwork line item may only be billed once the certificate of final completion has been fully executed.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Coordination
- B. Pre-construction meeting
- C. Progress meetings
- D. Coordination Meetings
- E. Requests for Interpretation (RFIs)
- F. Background Checks
- G. Notifications for Capitol Complex
- H. Utility Locates/Ground Penetrations for Capitol Complex
- I. Utility Locates/Ground Penetrations
- J. Fire Watch for Capitol Complex

1.02 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the project manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative procedures: The Trade Contractor will coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Trade Contractor's Construction Schedule.
 - 2. Provide updated information for Construction Manager's Construction Schedule.
 - 3. Preparation of Schedule of Values.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Pre-installation conferences.
 - 7. Project closeout activities
- C. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work, which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated conceal pipes and wiring within the construction. Coordinate locations of piping with finish elements.
- F. Coordinate completion and cleanup of work of separate sections in preparation for Substantial Completion.
- G. After owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of owner's activities.
- H. During construction coordinate use of site and facilities through Construction Manager.

- I. Comply with Construction Manager and Owner's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- J. Make the following types of submittal to Architect through the Construction Manager via Procore:
 - 1. Request for Information/Interpretation.
 - 2. Request for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction punch list and final correction punch list for substantial completion
 - 11. Closeout submittals

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

- A. The Construction Manager and Owner will schedule a meeting after Notice of Award.
- B. Required: Design Professional, Owner, Construction Manager, Trade Contractor and any Sub Contractors.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Designation of personnel representing the parties in Contract.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, change orders, RFIs and contract closeout procedures
 - 7. Tentative construction schedule.
 - 8. Critical work sequencing and long-lead items.
 - 9. Procedures for testing and inspecting.
 - 10. Preparation of Record Documents.
 - 11. Safety Procedures.
 - 12. Owner's requirements.
 - 13. Security and housekeeping procedures.
 - 14. Background Checks.
 - 15. Responsibility for temporary facilities and controls.
 - 16. Construction waste management.
 - 17. Logistics (use of premise, parking, work restrictions, maintain egress, etc.)
- D. The Construction Manager is to record minutes and distribute copies within two days after meeting to participants, with one copy to owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. The Construction Manager shall schedule and administer meetings throughout the progress of the work at bi-weekly intervals.

- B. The Construction Manager is to make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings, record minutes and distribute copies within two days to those affected by decisions made.
- C. Attendees may include: Project superintendent, major subcontractors and suppliers, Owner, Construction Manager, Architect/Engineer, as appropriate to agenda topics for each meeting. All participants at the conference call shall be familiar with the Project and authorized to conclude matters relating to the Work.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review the Construction Manager's Construction Schedule.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFI's.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to work.
 - 14. Access, temporary facilities and controls, housekeeping and progress cleaning.
 - 15. Safety.
 - 16. Status of proposal requests, pending changes, official Change Orders.
- E. Minutes:
 - 1. Following the meeting, the meeting minutes will be published in Procore by the Construction Manager for all parties.

3.03 COORDINATION MEETINGS

- A. Coordination meetings will be held at the discretion of the construction manager.

3.04 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, prepare and submit an RFI in Procore.
 - 1. RFIs shall originate with Trade Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in the Work.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 - 1. Specification Section number and title and related paragraphs, as appropriate.
 - 2. Drawing number and detail references, as appropriate.
 - 3. Field dimensions and conditions, as appropriate.
 - 4. Trade Contractor's suggested solution(s). If Trade Contractor's solution(s) impact the Contract Time or the Contract Sum, Trade Contractor shall state impact in the RFI.
 - 5. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
- C. Design Professional's Action: Design Professional will review each RFI, determine action required, and return it. Allow seven (7) working days for Design Professional's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day. The following RFIs will be returned without action:
 - 1. Requests for approval of submittals.
 - 2. Requests for approval of substitutions.
 - 3. Requests for coordination information already indicated in the Contract Documents.

4. Requests for adjustments in the Contract Time or the Contract Sum.
 5. Requests for interpretation of Design Professional's actions on submittals.
 6. Incomplete RFIs or RFIs with numerous errors.
 7. Design Professional's action may include a request for additional information, in which case Design Professional's time for response will start again.
- D. Design Professional's action on RFIs that may result in a change to the Contract Time or the Contract Sum/Price.
1. If Trade Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Construction Manager in writing within ten (10) days of receipt of the RFI response.
- E. On receipt of Design Professional's response in Procore, review the response and notify Design Professional within seven (7) days if Trade Contractor disagrees with response.

3.05 BACKGROUND CHECKS

- A. Background checks must be performed on all on site employees, including sub-contractors.
- B. The Contractor hereby explicitly authorized the Iowa DAS to conduct criminal history and/or other background investigation(s) of the Contractor, its officers, supervisory personnel, employees, and other staff retained by the Contractor or their sub-contractors for the performance of the contract.
- C. A state of Iowa record check request form will be provided at the pre-construction meeting. Information required may include:
 1. Last Name
 2. First Name
 3. Middle Name
 4. Date of Birth
 5. State Driver's License or State ID #
 6. Social Security #

3.06 NOTIFICATIONS FOR CAPITOL COMPLEX

- A. For work on Capitol Complex, notification requests must be provided to Construction Manager for work affecting the following:
 1. Parking Access
 2. Excessive Noise
 3. Odors
 4. Disruption of Equipment
 5. Excessive Dust
 6. Fire Alarm
 7. HVAC System/Controls
 8. Plumbing/Restrooms
 9. Lighting
 10. Power/Electrical
- B. Information must be received on form following this section
 1. Notice for tunnel repairs must be received by the Construction Manager for forward to Owner's Representative a minimum of ten (10) working days before the work is to occur (for tunnel shut downs).
 2. All other notices must be received by the Construction Manager for forward to Owner's Representative a minimum of three (3) working days prior to the work occurring.

3.07 UTILITY LOCATES/GROUND PENETRATIONS FOR CAPITOL COMPLEX

- A. Call Iowa One Call at 800-292-8989 to request a Joint Meeting Locate.
 1. Requests must be least five (5) working days prior to ground penetration.
 2. A representative from the requesting group and DAS must be present for the Joint Meeting Locate.

- B. Complete the Capitol Complex Digging Application online at <https://das.iowa.gov/general-services/capitol-complex-events/digging-application-form>.
- C. Requesting groups will mark the area(s) intended to be penetrated with white spray paint or mark with white flags.
- D. One Call and/or Vannguard must place their locate flags appropriately in the areas.
- E. Contractor requesting the locate will be responsible for the locate charge.
- F. Ground penetration on Capitol Complex is not allowed until the steps listed above have been taken and locations have been approved.

3.08 UTILITY LOCATES/GROUND PENETRATIONS

- A. Call Iowa One Call at 800-292-8989 to request a locate
 - 1. Requests must be least five (5) working days prior to ground penetration.

3.09 FIRE WATCH FOR CAPITOL COMPLEX

- A. Fire watch is to be performed any time the fire alarm is disabled for more than four hours. This includes both when the system is in bypass and when any detectors are disabled by removal or covering.
- B. When fire alarm is disabled for four hours or less it will be at the discretion of Owner to determine if fire watch must be provided.
- C. Written notice must be received two (2) working days prior to scheduling of fire watch.

END OF SECTION

CONSTRUCTION PROJECT REQUEST FOR NOTIFICATION AND/OR SERVICES FROM CAPITOL COMPLEX MAINTENANCE (CCM)

Notifications must be provided to Owner's Representative to forward to CCM Plant Operations Manager. Information must be received by Owner's Representative in email format. Notice for tunnel repairs must be received 11 days before the work is to occur (for tunnel shut downs). All other notices must be received by the Owners Representative 4 working days prior to the work occurring.

DAS Project Number: _____

Brief Description of Work: _____

Building: _____

Affected Locations within Building: _____

Dates of Work: _____

Hours of Work: _____

Impact: ☐ Parking ☐ Noise ☐ Odors ☐ Equipment ☐ Other disruption

☐ Dust ☐ Fire Alarm ☐ HVAC ☐ Plumbing/Restroom ☐ Lighting

☐ Power/Electrical ☐ Private/Public Utility Locate ☐ _____

Escort: ☐ Required ☐ Not Required ☐ Need assistance to determine

Additional Information: (or attached map/drawing of affected area/impact)

SECTION 01 3100.01

WEB BASED CONSTRUCTION MANAGEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Owner and Contractor shall utilize **Procore Technologies, Inc. Procore** system for electronic submittal of all data and documents (unless specified otherwise by the owner's representative) throughout the duration of the Contract. **Procore** is a web-based electronic media site that is hosted by **Procore Technologies, Inc.**, utilizing their **Procore** web solution. **Procore** will be made available to all contractors' project personnel, subcontractor personnel, suppliers, consultants and the Designer of Record. The joint use of this system is to facilitate; electronic exchange of information, automation of key processes, and overall management of the contract. **Procore** shall be the primary means of project information submission and management. When required by the Owners representative, paper documents will also be provided. In the event of discrepancy between the electronic version and paper documents, the paper documents will govern. **Procore** is a registered trademark of **Procore Technologies, Inc.**

1.02 USER ACCESS LIMITATIONS

- A. The Owner's Representative/Construction Manager will control the Contractor's access to **Procore** by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system, determine assigned function-based authorizations (determines what can be seen) and user privileges (determines what they can do). Sub-contractors and suppliers will be given access to **Procore** through the Contractor. Entry of information exchanged and transferred between the Contractor and its sub-contractors and suppliers on **Procore** shall be the responsibility of the Contractor.
 - 1. Joint Ownership of Data: Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the **Procore** system) by the Owner's Representative and the Contractor will be jointly owned.

1.03 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING

- A. Review comments made (or lack thereof) by the Owner on Contractor submitted documentation shall not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. Owner's acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

1.04 SUBMITTALS

- A. See Section 01 3300 SUBMITTAL PROCEDURES:
- B. Preconstruction Submittals
 - 1. List of Contractor's key **Procore** personnel. Include descriptions of key personnel's roles and responsibilities for this project. Contractor should also identify their organization's administrator on the list.

1.05 COMPUTER REQUIREMENTS

- A. The Contractor shall use computer hardware and software that meets the requirements of the **Procore** system as recommended by **Procore Technologies, Inc.** to access and utilize

Procore. As recommendations are modified by **Procore**, the Contractor will upgrade their system(s) to meet the recommendations or better. Upgrading of the Contractor's computer systems will not be justification for a cost or time modification to the Contract. The contractor will ensure that connectivity to the **Procore** system (whether at the home office or job site) is accomplished through DSL, cable, T-1 or wireless communications systems. The minimum bandwidth requirement for using the system is 128kb/s. It is recommended a faster connection be used when uploading pictures and files into the system. **Procore** supports the current and prior two major versions of Chrome, Firefox, Internet Explorer, and Safari.

- B. The Contractor shall be responsible for the validity of their information placed in **Procore** and for the abilities of their personnel. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, cad drawing applications, and Adobe Portable Document Format (PDF) document distribution program. The Contractor shall utilize the existing forms in **Procore** to the maximum extent possible. If a form does not exist in **Procore** the Contractor must include a form of their own or provided by the Owner representative as an attachment to a submittal. Adobe PDF documents will be created through electronic conversion rather than optically scanned whenever possible. The Contractor is responsible for the training of their personnel in the use of **Procore** (outside what is provided by the owner) and the other programs indicated above as needed.
- C. User Access Administration: Provide a list of Contractor's key **Procore** personnel for the Owner's Representative acceptance. Contractor is responsible for adding and removing users from the system. The Owners Representative reserves the right to perform a security check on all potential users. The Contractor will be allowed to add additional personnel and sub-contractors to **Procore**.

1.06 CONNECTIVITY PROBLEMS

- A. **Procore** is a web-based environment and therefore subject to the inherent speed and connectivity problems of the Internet. The Contractor is responsible for its own connectivity to the Internet. **Procore** response time is dependent on the Contractor's equipment, including processor speed, Internet access speed, etc. and current traffic on the Internet. The Owner will not be liable for any delays associated from the usage of **Procore** including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information. The contractor will ensure that connectivity to the **Procore** system (whether at the home office or job site) is accomplished through DSL, cable, T-1 or wireless communications systems. The minimum bandwidth requirement for using the system is 128kb/s. It is recommended a faster connection be used when uploading pictures and files into the system. Under no circumstances shall the usage of the **Procore** be grounds for a time extension or cost adjustment to the contract.

1.07 TRAINING

- A. The Construction Manager shall provide the necessary training to the Prime Contractor.

PART 2 - PRODUCTS

2.01 DESCRIPTION

- A. **Procore** project management application (no equal) Provided by Procore Technologies, Inc. www.Procore.com

PART 3 - EXECUTION

3.01 PROCORE UTILIZATION

- A. **Procore** shall be utilized in connection with submittal preparation and information management required by Sections:
 - 1. PROJECT MANAGEMENT AND COORDINATION
 - 2. CONSTRUCTION PROGRESS DOCUMENTATION
 - 3. SUBMITTAL PROCEDURES
 - 4. QUALITY REQUIREMENTS
 - 5. Other Division One sections.
 - 6. Requirements of this section are in addition to requirements of all other sections of the specifications.
- B. Design Document Submittals
 - 1. All design drawings and specifications shall be submitted as cad .dwg files or PDF attachments to the **Procore** submittal work flow process and form.
- C. Shop Drawings
 - 1. Shop drawing and design data documents shall be submitted as cad .dwg files or PDF attachments to the **Procore** submittal work flow process and form. Examples of shop drawings include, but are not limited to:
 - 2. Standard manufacturer installation drawings.
 - 3. Drawings prepared to illustrate portions of the work designed or developed by the Contractor.
 - 4. Steel fabrication, piece, and erection drawings.
- D. Product Data
 - 1. Product catalog data and manufacturer's instructions shall be submitted as
 - 2. PDF attachments to the **Procore** submittal work flow process and form. Examples of product data include, but are not limited to:
 - 3. Manufacturer's printed literature.
 - 4. Preprinted product specification data and installation instructions.
- E. Samples
 - 1. Sample submittals shall be physically submitted as specified in Section 01 3300 SUBMITTAL PROCEDURES. Contractor shall enter submittal data information into **Procore** with a copy of the submittal form(s) attached to the sample. Examples of samples include, but are not limited to:
 - 2. Product finishes and color selection samples.
 - 3. Product finishes and color verification samples.
 - 4. Finish/color boards.
 - 5. Physical samples of materials.
- F. Administrative Submittals
 - 1. All correspondence and pre-construction submittals shall be submitted using **Procore**. Examples of administrative submittals include, but are not limited to:
 - 2. Digging permits and notices for excavation.
 - 3. List of product substitutions
 - 4. List of contact personnel.
 - 5. Notices for roadway interruption, work outside regular hours, and utility cut overs.
 - 6. Requests for Information (RFI).
 - 7. Construction progress Schedules and associated reports and updates.
 - a. Each schedule submittal specified in CONSTRUCTION PROGRESS DOCUMENTATION shall be submitted as a native backed-up file (.PRX or .STX) of the scheduling program being used. The schedule will also be posted as a PDF

- file in the format.
8. Plans for safety, demolition, environmental protection, and similar activities.
 9. Quality Control Plan(s), Testing Plan and Log, Quality Control Reports, Production Reports, Quality Control Specialist Reports, Preparatory Phase Checklist, Initial Phase Checklist, Field Test reports, Summary reports, Rework Items List, etc.
 10. Meeting minutes for quality control meetings, progress meetings, pre-installation meetings, etc.
 11. Any general correspondence submitted.
- G. Compliance Submittals
1. Test reports, certificates, and manufacture field report submittals shall be submitted on **Procore** as PDF attachments. Examples of compliance submittals include, but are not limited to:
 - a. Field test reports.
 - b. Quality Control certifications.
 - c. Manufacturer's documentation and certifications for quality of products and materials provided.
- H. Record and Closeout Submittals
1. Operation and maintenance data and closeout submittals shall be submitted on **Procore** as PDF documents during the approval and review stage as specified, with actual set of documents submitted for final. Examples of record submittals include, but are not limited to:
 - a. Operation and Maintenance Manuals: Final documents shall be submitted as specified.
 - b. As-built Drawings: Final documents shall be submitted as specified.
 - c. Extra Materials, Spare Stock, etc.: Submittal forms shall indicate when actual materials are submitted.
- I. Financial Submittals
1. Schedule of Value, Pay Applications and Change Request Proposals shall be submitted on **Procore**. Supporting material for Pay Applications and Change Requests shall be submitted on **Procore** as PDF attachments. Examples of compliance submittals include, but are not limited to:
 - a. Contractors Schedule of Values
 - b. Contractors Monthly Progress Payment Requests
 - c. Contract Change proposals requested by the project owner

END OF SECTION

SECTION 01 3200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Construction Progress Schedule
- B. Construction Manager's Construction Schedule
- C. Submittal Schedule
- D. Daily Construction Reports
- E. Progress Photographs

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 CONSTRUCTION MANAGER'S MASTER CONSTRUCTION SCHEDULE

- A. Upon award of package, Contractor agrees to accept and meet or improve upon the schedule proposed in section **00 3113 PRELIMINARY SCHEDULE** with intermediate handoffs. Each package contractor will be required to participate in schedule coordination meetings with the Construction Manager.
- B. If the bid package contractor does not meet the handoff milestones in the master construction schedule, the bid package contractor shall take measures to increase work forces, increase work hours, initiate revisions to means and methods of construction, and/or other similar measures as required to make up lost time and complete the work in accordance with the construction schedule and remain consistent with project progress and overall construction schedule. Such measures shall be at no additional cost to the Owner. The Construction Manager shall have sole discretion on decisions to accelerate work.
- C. Updating the master construction schedule – Contractors are required to attend and participate in schedule coordination update meetings with the Construction Manager. This will be an opportunity for contractors to further define their scheduled scope of work in conjunction with other trades on site.
- D. Acceptance of revised master construction schedule – After an updated master construction schedule has been issued via Procore, Contractors will have 48 hours to dispute the new schedule. All contractors will be held to the last fully accepted master construction schedule.

3.02 CONSTRUCTION PROGRESS SCHEDULE

- A. Submit preliminary outline to the Construction Manager no later than 48 hours prior to the pre-construction meeting for coordination with Owner's requirements.
- B. Submit revised progress schedule with each application for payment.
- C. Schedules will be electronically submitted through Procore.
- D. Distribute copies of reviewed schedules to project site file, subcontractors, suppliers, and other concerned parties.
- E. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.
- F. Submit computer generated horizontal bar chart with separate line for each major portion of work or operation, identifying the first day of each week.
- G. Show complete sequence of construction activity, identifying work of separate stages and other

logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

- H. Indicate estimated percentage of completion for each item of work at each submission.
- I. Participate in joint review and evaluation of schedule with Construction Manager.
- J. Revisions to schedules:
 - 1. Indicate progress of each activity to date of submittal and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
 - 3. Prepare narrative report to define problem areas, anticipate delays, and impact on schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

3.03 SUBMITTAL SCHEDULE

- A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrications, and delivery when establishing dates.
 - 1. Coordinate submittal schedule with list of subcontractors, the schedule of values, and construction schedule.
 - 2. Submit concurrently with first complete submittal of contractor's construction schedule.

3.04 DAILY CONSTRUCTION REPORTS

- A. Daily Construction Reports: Submitted at weekly intervals.
 - 1. Daily Construction Reports will be submitted to Construction Manager.
- B. Prepare a daily construction report recording the following information concerning events at project site:
 - 1. Count of personnel at Project site
 - 2. Equipment at Project site
 - 3. Material Deliveries
 - 4. High and low temperatures and general weather conditions, including presence of rain or snow
 - 5. Accidents
 - 6. Meetings and significant decisions
 - 7. Unusual events
 - 8. Stoppages, delays, shortages, and losses
 - 9. Meter readings and similar recordings
 - 10. Emergency procedures
 - 11. Orders and requests of authorities having jurisdiction
 - 12. Change orders received and implemented
 - 13. Services connected and disconnected
 - 14. Equipment or system tests and startups
 - 15. Partial completions and occupancies
 - 16. Substantial completions authorized

3.05 PROGRESS PHOTOGRAPHS

- A. Progress photographs will be electronically submitted through Procore.
- B. Preconstruction Photographs: Before starting construction, take photographs of project site and surrounding properties, including existing items to remain during construction, from different

vantage points, as directed by Construction manager.

1. Take additional photographs as required to record existing damage to site, structure, equipment, or finishes.
- C. Periodic Construction Photographs: Take photographs at regular intervals. Select vantage points to show status of construction and progress since last photographs were taken.
- D. Field Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as project record documents. Construction manager will inform of desired vantage points.

END OF SECTION

SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Submittals for Review
- B. Submittals for Information
- C. Submittal Procedures
- D. Samples

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product Data
 - 2. Shop Drawings
 - 3. Samples for Selection
 - 4. Samples for Verification
- B. Submit to Construction Manager to forward to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record document purposes.

3.02 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Construction Manager, Architect, and Owner's knowledge. No action will be taken.

3.03 SUBMITTAL PROCEDURES

- A. Submittals will be electronically submitted through Procore. Contractor will be invited to join web based program after issue of Notice of Intent to award.
- B. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - 2. Do not reproduce the Contract Documents to create shop drawings.

3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- C. Transmit each submittal with a copy of approved submittal form.
- D. Sequentially number the submittal form. Revise submittals with original number and a sequential numeric suffix.
- E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- F. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
- G. Schedule submittals to expedite the project and coordinate submission of related items.
- H. For each submittal review, allow 15 days excluding delivery time to and from the contractor.
- I. Identify variations from the Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
- J. When revised for resubmission, identify all changes made since previous submission.
- K. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- L. Submittals not requested will not be recognized or processed.

3.04 **SAMPLES**

- A. Submit to Construction Manager to forward to Architect/Engineer for review for limited purpose for checking conformance with information given and design concept expressed in the Contract Documents.
- B. Samples for selection as specified in product sections:
 1. Submit to Construction Manager to forward to Architect/Engineer for aesthetic, color, or finish selections.
 2. Submit samples of finishes from full range of manufacturer's standard colors, textures, and patterns to Construction Manager to forward to Architect/Engineer for selection.
- C. Submit samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Include identification on each sample, with full project information.
- E. Submit number of samples specified in individual specification sections.
- F. Photograph of submitted samples, along with transmittal sheet, shall be uploaded as a submittal in Procore.

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. References
- B. Quality assurance and control of installation
- C. Tolerances
- D. Defect Assessment
- E. Inspection and testing laboratory services
- F. Manufacturer's field services and reports

1.02 REFERENCES

- A. Conform to reference standard in effect at date of contract.
- B. When required by contract documents, obtain copies of standards.
- C. Should specified reference standards conflict with contract documents request clarification from engineer before proceeding.
- D. The contractual relationship of the parties to the contract shall not be altered from the contract documents by mention or inference otherwise in any reference document.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.
- B. Comply fully with manufacturer's instructions, including each step in sequence.
- C. Should manufacturer's instructions conflict with contract documents, request clarification from the engineer prior to proceeding.
- D. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stress, vibration, physical distortion, or disfiguration.

3.02 TOLERANCES

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

3.03 DEFECT ASSESSMENT

- A. Replace work or portions of work not conforming to specified requirements.

- B. If, in the option of the Owner, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or recommend adjusted payment.

3.04 INSPECTION AND TESTING

- A. Owner shall include and pay for all required special inspections and testing required by IBC Section 1705, if applicable. This does not include inspections and testing required by other specification sections in this Project Manual. Copies of all testing and inspection reports shall be submitted to the Construction Manager and Design Professional by the testing and inspection agency.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect, Construction Manager, and contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of contract documents.
 - 4. Immediately notify the Construction Manager and contractor of observed irregularities or non-conformance of work or products.
 - 5. Perform additional testing and inspections required by the Owner
- C. Limits on Testing Agency/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirement of contract documents.
 - 2. Agency may not approve or accept any portion of the work.
 - 3. Agency may not assume any duties of the contractor.
 - 4. Agency has no authority to stop the work.
- D. Contractor responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the work and to manufacturer's facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of products to be tested/inspected.
 - c. To facilitate test/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Construction Manager and laboratory 24 hours prior to expected time for operations requiring testing/inspection.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same testing agency on instruction by Architect/Construction Manager.
- F. Re-testing required because of non-conformance to specified requirements shall be paid for by the Contractor.

3.05 MANUFACTURER'S FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start up of equipment, test, adjust and balance of equipment as applicable and to initiate instructions when necessary.
- B. Individuals are to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to the manufacturers' written instructions.
- C. Submit report in duplicate within 30 days of observation to Construction Manager for review.

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Temporary Utilities
- B. Temporary Sanitary Facilities
- C. Telephone Service
- D. Removal of Utilities, Facilities, and Controls
- E. Temporary Facilities
- F. Equipment
- G. Vehicular Access and Parking
- H. Traffic Regulation
- I. Barriers
- J. Enclosures and Fencing
- K. Waste Removal

1.02 TEMPORARY UTILITIES

- A. Owner will provide the following:
 - 1. Electrical Power, consisting of connection to existing facilities.
 - 2. Water Supply, consisting of connection to existing facilities.
- B. The Contractor shall pay for installation, maintenance, and removal of temporary utilities. Temporary utilities shall not disrupt the Facility's need for continuous service.

1.03 TEMPORARY SANITARY FACILITIES

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

1.04 TELEPHONE SERVICE

- A. Provide, maintain, and pay for telephone service to field or use a cellular telephone.

1.05 REMOVAL OF UTILITIES, FACILITIES AND CONTROLS

- A. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS

2.01 TEMPORARY FACILITIES

- A. Field Offices: Coordinate with Construction Manager and Owner if applicable.

2.02 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated, with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.01 VEHICULAR ACCESS AND PARKING

- A. Use designated existing on-site roads for construction traffic.
- B. Parking is as directed by Owner.
- C. When site space is not adequate, provide additional off-site parking.
- D. Use of designated existing on-site streets and driveways used for construction traffic is permitted. Track vehicles not allowed on paved areas.
- E. Use of designated areas of existing parking facilities used by construction personnel as permitted.
- F. Do not allow heavy vehicles or construction equipment in parking areas.
- G. Provide and maintain access to fire hydrants, free of obstructions.
- H. Provide means of removing mud from vehicle wheels before entering streets.

3.02 TRAFFIC REGULATION

- A. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.
- B. Flares and lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
- C. Haul Routes:
 - 1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
- D. Removal:
 - 1. Remove equipment and devices when no longer required.
 - 2. Repair damage caused by demolition.

3.03 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for Owner's use of site and to protect existing facilities and adjacent properties from damage during construction operations.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

3.04 ENCLOSURES AND FENCING

- A. Provide temporary enclosure and fences as necessary to protect the public and secure the site.
- B. Provide 4 foot high green fence around construction site; equip with vehicular and pedestrian gates with locks.
- C. Provide security and facilities to protect work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

3.05 WASTE REMOVAL

- A. Except for items or materials to be salvaged, recycled or otherwise reused, remove waste materials from project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Waste Disposal Facilities: Provide waste collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. General product requirements
- B. Product options
- C. Maintenance materials
- D. Transportation and handling
- E. Storage and protections

PART 2 - PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

- A. Provide new products unless specifically required or permitted by the contract documents.
- B. Do not use products having any of the following characteristics:
 - 1. Made using or containing CFC's or HCFC's
 - 2. Made of wood from newly cut old growth timber.
- C. Where all other criteria are met, contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions
 - 2. If wet-applied, have lower VOC content
 - 3. Are extracted, harvested, and/or manufactured closer to the location of the project
 - 4. Have longer documented life span under normal used
 - 5. Result in less construction waste
 - 6. Are made of vegetable materials that are rapidly renewable

2.02 PRODUCT OPTIONS

- 1. Products specified by reference standards or by description only: Use of any product meeting those standards or description.
- 2. Products specified by naming one or more manufacturers, with or without a provision for substitutions: Use a product of one of the manufacturers named and meeting specifications or submit a request for substitution for any manufacturer not named by the date specified in this project manual. Substitution requests shall be emailed to the Issuing Officer at the email address provided in Instructions to Bidders Section 1.04.

2.03 MAINTENANCE MATERIALS

- 1. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- 2. Deliver to project site; obtain receipt prior to final payment.

PART 3 - EXECUTION

3.01 TRANSPORTATION AND HANDLING

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

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

3.02 STORAGE AND PROTECTIONS

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to the product.
- E. For exterior storage of fabricated products, place on slopped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturers' warranty conditions, if any.
- H. Cover product subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 7300

EXECUTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures
- B. Alteration project procedures
- C. Cutting and patching
- D. Cleaning and protection
- E. Adjusting

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION, PREPARATION, AND GENERAL INSTALLATION PROCEDURES

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misproduction.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to cutting: Examine existing conditions prior to commencing work; include 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.
- G. Clean substrate surfaces prior to applying next material or substance.
- H. Seal cracks or openings of substrate prior to applying next material or substance.
- I. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.
- J. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- K. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- L. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- M. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- N. Make neat transitions between different surfaces, maintaining texture and appearance.

3.02 ALTERATION PROJECT PROCEDURES

- A. Materials: As specified in product sections match existing products and work for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished work.
- E. Remove, cut and patch work in a manner to minimize damage and to provide a means of restoring products and finished to original condition.

- F. Remove debris and abandoned items from area and from concealed spaces.
- G. Refinish visible existing surfaces to remain in renovated rooms and spaces to specified condition for each material with a neat transition to adjacent finishes.
- H. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.
- I. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line of division and make recommendation to the Construction Manager. Prior to cutting get the Owner's approval.
- J. Where change of plane of ¼ inch or more occurs, submit recommendation for providing smooth transition to the Construction Manager for review.

3.03 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements which affect:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Efficiency, maintenance, or safety of element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of owner or separate contractor.
- C. Execute cutting, fitting, and patching to complete work, and to:
 - 1. Fit the several parts together, to integrate with other work.
 - 2. Uncover work to install or correct ill-timed work.
 - 3. Remove and replace defective and non-conforming work.
 - 4. Remove samples of installed work for testing.
 - 5. Provide openings in elements of work for penetrations of mechanical and electrical work.
- D. Execute work by methods to avoid damage to other work and which will provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Cut masonry and concrete materials using masonry saw or core drill.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work tight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- I. Maintain integrity of wall, ceiling or floor construction; completely seal voids.
- J. Refinish surfaces to match adjacent finishes. Refinish to nearest intersection for continuous surfaces. Refinish entire unit for continuous surfaces for an assembly.
- K. Identify hazardous substances or conditions exposed during the work to the engineer for decision or remedy.

3.04 CLEANING AND PROTECTION

- A. Progress cleaning
 - 1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
 - 2. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.
- B. Protection of installed work
 - 1. Protect installed work from damage by construction operations.
 - 2. Provide special protection where specified in individual specification sections.
 - 3. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
 - 4. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.
 - 5. Prohibit traffic from landscaped areas.

3.05 ADJUSTING

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

END OF SECTION

SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Inspections
- B. Substantial Completion
- C. Project Record Documents
- D. Warranties
- E. Operations and Maintenance Manuals
- F. Operations and Maintenance Data for Materials and Finishes
- G. Operations and Maintenance Data for Equipment and Systems
- H. Training
- I. Final Completion
- J. Maintenance

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 INSPECTIONS

- A. Ensure all state inspections have been completed by the authority having jurisdiction.
- B. Upload documentation of all test/inspections to Procore.
- C. Submit a written request for inspection of Substantial Completion. On receipt of request, The Design Professional will either proceed with inspection or notify contractor of unfulfilled requirements. The Design Professional will prepare the Certificate of Substantial Completion after inspection or will notify contractor of items, either on contractor's list or additional items identified by architect that must be completed or corrected before certificate will be issued.
 - 1. Re-inspection: Request re inspection when the work identified in previous inspections as incomplete is completed or corrected.
 - 2. Results of completed inspection will form the basis of requirements for Final Completion.

3.02 SUBSTANTIAL COMPLETION

- A. A substantial completion checklist is attached for reference following this specification section.
- B. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to the Construction Manager through upload to Procore.
- C. Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Submit written certification that contract documents have been reviewed, work has been inspected, and that work is completed in accordance with contract documents and ready for review
 - 2. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the work has not been completed.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Make final changeover of permanent locks and deliver key to the owner. Advise owner's personnel of changeover in security provisions.
 - 5. Complete startup testing of systems.
 - 6. Submit test/adjust, balance records.
 - 7. Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.

8. Advise owner of changeover in heat and other utilities.
9. Submit changeover information related to owner's occupancy, use, operation, and maintenance.
10. Complete final cleaning requirements, including touch up painting.
11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

3.03 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the work:
 1. Drawings
 2. Specifications
 3. Addenda
 4. Change orders and other modifications to the contract
 5. Reviewed shop drawings, product data, and samples
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 1. Manufacturer's name and product model and number.
 2. Product substitutions or alterations utilized.
 3. Changes made by Addenda and modifications.
- F. Record Drawings:
 1. Measured depths of foundations in relation to finish first floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 4. Field changes of dimension and detail.
 5. Details not on original contract drawings.
- G. Record Drawings shall be uploaded to Procore in pdf format.

3.04 WARRANTIES

- A. Submit written warranties for designated portions of the work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Submit properly executed warranties in Procore prior to Final Completion.
- C. Verify that documents are in proper form, contain full information, and are notarized.
- D. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- E. Include warranties in operation and maintenance manuals.
- F. Items of work delayed beyond date of Substantial Completion, provide updated submittal after acceptance by Owner, listing date of acceptance as start of warranty period

3.05 OPERATIONS AND MAINTENANCE MANUALS

- A. Format: Submit operations and maintenance manuals in the following format:
 1. Portable Document Format (PDF) electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Owner and upload to Procore.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.

2. Assemble with data arranged in the same sequence as, and identified by the specification sections. Where systems involve more than one specification section, provide separate index for each system.
3. Include project directory listing title and address of project, names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
4. Include Table of Contents listing every item separated by index and specification section.
- B. Source Data: For each product or system, list names, addresses, and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use project record documents as maintenance drawings.
- E. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.06 OPERATIONS AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For each product, applied material, and finish:
 1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specified products.

3.07 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For each item of equipment and each system:
 1. Description of unit or system, and component parts
 2. Identify function, normal operating characteristics, and limiting conditions
 3. Include performance curves, with engineering data and tests
 4. Complete nomenclature and model number of replacement parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specified products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance requirements: Include routine procedure and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.

- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.
- P. Additional requirements: As specified in individual specification sections.

3.08 TRAINING

- A. Demonstrate operations of systems, subsystems, and equipment.
- B. Train in operation and maintenance of systems, subsystems, and equipment
- C. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- D. Submit written agenda to Construction Manager for approval prior to scheduling training.
- E. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

3.09 FINAL COMPLETION

- A. A final completion checklist is attached for reference following this specification section.
- B. Before requesting final inspection for determining date of Final Completion, complete the following:
 - 1. Complete punch list items.
 - 2. Prepare and submit project record documents, operation and maintenance manuals, damage or settlement surveys, and similar final record information.
 - 3. Deliver tools, spare parts, extra materials, and similar items to location designated by owner. Label with manufacturer's name and model number where applicable.
 - 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 - 5. All trailers, construction signs, unused, broken or demolition materials have been removed from the site and the premises returned to the original condition in the opinion of the Owner and Design Professional.
 - 6. Submit a final Application for Payment (retainage).
- C. Upon receipt of final payment complete final completion certificate in Procore.

END OF SECTION

Substantial Completion Project Checklist

Date: _____

DAS Project Number: _____

Project Title: _____

Location: _____

Contractor: _____

In order to process the 99% payment (100% pay app less closeout and retainage) on a Capital Project, the Department of Administrative Services needs the following information. Please complete this form and obtain the necessary documents.

Have all state inspections been completed and documentation uploaded to Procore?
(Including but not limited to the following inspections)

Boiler Inspection ☐ Yes ☐ No ☐ N/A

Water Heater Inspection ☐ Yes ☐ No ☐ N/A

Energy Code Inspection ☐ Yes ☐ No ☐ N/A

Building Code Inspection ☐ Yes ☐ No ☐ N/A

Electrical Inspection ☐ Yes ☐ No ☐ N/A

Elevator Inspection ☐ Yes ☐ No ☐ N/A

Other: _____ ☐ Yes ☐ No ☐ N/A

☐ Occupancy Permit if applicable

☐ Test and Balance has been performed

☐ Certificate of Substantial Completion in Procore (Consensus Docs 814)

Are there any disputes with the above mentioned vendor which need resolution?

☐ Yes (provide description below) ☐ No

Can payment (less closeout and retainage) be released? ☐ Yes ☐ No

Final Completion Project Checklist

Date: _____

DAS Project Number: _____

Project Title: _____

Location: _____

Contractor: _____

In order to process the 100% payment and Retainage payment on a Capital Project, the Department of Administrative Services needs the following information. Please complete this form and obtain the necessary documents.

Have all Warranties been received? ☐ Yes ☐ No

Have the Operations and Maintenance Manuals been received? ☐ Yes ☐ No

Who is in possession of the O & M Manuals? _____

Has all training been completed? ☐ Yes ☐ No

Have all as-built drawings been scanned and uploaded into Procore? ☐ Yes ☐ No

Have electronic drawing/specification files been transferred to DAS? ☐ Yes ☐ No

Have all Test & Balance reports been received? ☐ Yes ☐ No

Have all punchlist items been corrected? ☐ Yes ☐ No

☐ **573 Notification** (*To be obtained from the general contractor*): Copy of general contractor's notification of application for retainage to all subcontractors and suppliers. General contractor must follow IAC 26 section 23.13.2.

☐ **AIA Form G706 – Contractor's Affidavit of Payment of Debts and Claims**

☐ **AIA Form G706A – Contractor's Affidavit of Release of Liens**

☐ **AIA Form G707 – Consent of Surety Company to Final Payment**

☐ **Certificate of Final Completion in Procore (Consensus Docs 815)**

Are there any disputes with the above mentioned vendor which need resolution?

☐ Yes (provide description below) ☐ No

Can 100% payment and retainage payment be released? ☐ Yes ☐ No

**SECTION 230513
COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.03 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

PART 2 PRODUCTS

2.01 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

2.02 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.03 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
 - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating.
- I. Insulation: Class F.
- J. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.04 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 - 2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- B. Furnish and install shaft grounding kit.

2.05 P3 EXECUTION (NOT APPLICABLE)

END OF SECTION

**SECTION 230529
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Fiberglass pipe hangers.
 - 4. Metal framing systems.
 - 5. Fiberglass strut systems.
 - 6. Thermal-hanger shield inserts.
 - 7. Equipment supports.

1.03 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

PART 2 PRODUCTS

2.01 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
 - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
 - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Stainless-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
- C. Copper Pipe Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
 - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.02 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.03 THERMAL-HANGER SHIELD INSERTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Carpenter & Paterson, Inc.
 - 2. Clement Support Services.
 - 3. ERICO International Corporation.
 - 4. National Pipe Hanger Corporation.
 - 5. PHS Industries, Inc.
 - 6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
 - 7. Piping Technology & Products, Inc.

8. Rilco Manufacturing Co., Inc.
 9. Value Engineered Products, Inc.
 10. Or engineer pre-approved equivalent.
- B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- C. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
- D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.04 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.05 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
1. Properties: Nonstaining, noncorrosive, and nongaseous.
 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 EXECUTION

3.01 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- E. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- F. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- G. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- H. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- I. Insulated Piping:

1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.02 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.03 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.04 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and attachments for general service applications.
- F. Use stainless-steel pipe hangers and stainless-steel attachments for hostile environment applications.
- G. Use copper-plated pipe hangers and stainless-steel attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.
- I. Use thermal-hanger shield inserts for insulated piping and tubing.
- J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.

3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
 5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
 17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
 19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.

4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

END OF SECTION 230529

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SECTION 230553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Pipe labels.

1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 PRODUCTS

2.01 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Brimar Industries, Inc.
 - c. Carlton Industries, LP.
 - d. Champion America.
 - e. Craftmark Pipe Markers.
 - f. emedco.
 - g. Kolbi Pipe Marker Co.
 - h. LEM Products Inc.
 - i. Marking Services, Inc.
 - j. Seton Identification Products.
 - k. Or engineer pre-approved equivalent.
 - 2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
 - 3. Letter Color: White.
 - 4. Background Color: Black.
 - 5. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 - 6. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 7. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 - 8. Fasteners: Stainless-steel rivets or self-tapping screws.
 - 9. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification

Section number and title where equipment is specified.

- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.02 PIPE LABELS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
 - 2. Brady Corporation.
 - 3. Brimar Industries, Inc.
 - 4. Carlton Industries, LP.
 - 5. Champion America.
 - 6. Craftmark Pipe Markers.
 - 7. emedco.
 - 8. Kolbi Pipe Marker Co.
 - 9. LEM Products Inc.
 - 10. Marking Seives Inc.
 - 11. Seton Identification Products.
 - 12. Or engineer pre-approved equivalent.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction according to ASME A13.1.
- C. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- D. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- E. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
 - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.02 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.03 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.04 PIPE LABEL INSTALLATION

- A. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels,

and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 5. Near major equipment items and other points of origination and termination.
 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
- B. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- C. Pipe Label Color Schedule:
1. Refrigerant Piping: White letters on a safety-green background.

END OF SECTION

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**SECTION 230593
TESTING, ADJUSTING AND BALANCING FOR HVAC**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:
 - a. Variable-air-volume systems.
 - 2. Testing, Adjusting, and Balancing Equipment:
 - a. Motors.
 - b. Condensing units.
 - 3. Control system verification.

1.03 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. BAS: Building automation systems.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- G. TDH: Total dynamic head.

1.04 PREINSTALLATION MEETINGS

- A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.
 - 1. Minimum Agenda Items:
 - a. The Contract Documents examination report.
 - b. The TAB plan.
 - c. Needs for coordination and cooperation of trades and subcontractors.
 - d. Proposed procedures for documentation and communication flow.

1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Certified TAB reports.
- C. Sample report forms.
- D. Instrument calibration reports, to include the following:
 - 1. Instrument type and make.
 - 2. Serial number.
 - 3. Application.
 - 4. Dates of use.
 - 5. Dates of calibration.

1.06 QUALITY ASSURANCE

- A. TAB Specialists Qualifications: Certified by AABC NEBB or TABB.
 - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC NEBB or TABB.

2. TAB Technician: Employee of the TAB specialist and certified by AABC NEBB or TABB as a TAB technician.

1.07 FIELD CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 TAB SPECIALISTS

- A. Subject to compliance with requirements, engage one of the following:
 1. Systems Management Company, Des Moines, Iowa
 2. Johnson Service of Des Moines, IA
 3. Precision Test & Balance
 4. Or engineer pre-approved equivalent.

3.02 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine equipment performance data including fan and pump curves.
 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- E. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- F. Examine test reports specified in individual system and equipment Sections.
- G. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- H. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- I. Examine operating safety interlocks and controls on HVAC equipment.
- J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.03 PREPARATION

- A. Prepare a TAB plan that includes the following:
 1. Equipment and systems to be tested.
 2. Strategies and step-by-step procedures for balancing the systems.
 3. Instrumentation to be used.
 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:
 - a. Clean filters are installed.
 - b. Fans are operating, free of vibration, and rotating in correct direction.
 - c. Variable-frequency controllers' startup is complete and safeties are verified.
 - d. Automatic temperature-control systems are operational.
 - e. Ceilings are installed.
 - f. Suitable access to balancing devices and equipment is provided.

3.04 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
- B. Take and report testing and balancing measurements in inch-pound (IP) units.

3.05 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. For variable-air-volume systems, develop a plan to simulate diversity.
- D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling-unit components.

3.06 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

- A. Adjust the variable-air-volume systems as follows:
 1. Select the terminal unit that is most critical to the supply-fan airflow. Measure inlet static pressure, and adjust system static pressure control set point so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
 2. Verify final system conditions as follows:
 - a. Re-measure and confirm that total airflow is within design.
 - b. Re-measure final fan operating data, rpms, volts, amps, and static profile.
 - c. Mark final settings.

3.07 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 1. Manufacturer's name, model number, and serial number.
 2. Motor horsepower rating.
 3. Motor rpm.
 4. Phase and hertz.
 5. Nameplate and measured voltage, each phase.
 6. Nameplate and measured amperage, each phase.
 7. Starter size and thermal-protection-element rating.
 8. Service factor and frame size.
- B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.08 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record fan and motor operating data.

3.09 CONTROLS VERIFICATION

- A. In conjunction with system balancing, perform the following:
 - 1. Verify temperature control system is operating within the design limitations.
 - 2. Confirm that the sequences of operation are in compliance with Contract Documents.
 - 3. Verify that controllers are calibrated and function as intended.
 - 4. Verify that controller set points are as indicated.
 - 5. Verify the operation of lockout or interlock systems.
 - 6. Verify that controlled devices are properly installed and connected to correct controller.
 - 7. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
 - 8. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.
- B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.10 TOLERANCES

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 5 percent.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.11 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 - 2. Include a list of instruments used for procedures, along with proof of calibration.
 - 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Fan curves.
 - 2. Manufacturers' test data.
 - 3. Field test reports prepared by system and equipment installers.
 - 4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
 - 1. Title page.
 - 2. Name and address of the TAB specialist.
 - 3. Project name.
 - 4. Project location.
 - 5. Engineer's name and address.
 - 6. Contractor's name and address.
 - 7. Report date.
 - 8. Signature of TAB supervisor who certifies the report.
 - 9. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 - 10. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.

- c. Description of system operation sequence if it varies from the Contract Documents.
- 11. Nomenclature sheets for each item of equipment.
- 12. Notes to explain why certain final data in the body of reports vary from indicated values.
- 13. Test conditions for fans and pump performance forms including the following:
 - a. Conditions of filters.
 - b. Cooling coil, wet- and dry-bulb conditions.
 - c. Fan drive settings including settings and percentage of maximum pitch diameter.
 - d. Settings for supply-air, static-pressure controller.
 - e. Other system operating conditions that affect performance.
- D. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
 - 1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.
 - 2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave and amount of adjustments in inches.
 - 3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Filter static-pressure differential in inches wg.
 - f. Preheat-coil static-pressure differential in inches wg.
 - g. Cooling-coil static-pressure differential in inches wg.
 - h. Heating-coil static-pressure differential in inches wg.
 - i. Return airflow in cfm.
- E. Instrument Calibration Reports:
 - 1. Report Data:
 - a. Instrument type and make.
 - b. Serial number.
 - c. Application.
 - d. Dates of use.
 - e. Dates of calibration.

3.12 VERIFICATION OF TAB REPORT

- A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of commissioning authority.
- B. Commissioning authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.

- C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- E. If TAB work fails, proceed as follows:
 - 1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 - 2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
- F. Prepare test and inspection reports.

END OF SECTION

**SECTION 230719
HVAC PIPING INSULATION**

HVAC PIPING INSULATION

PART 1 GENERAL

2.01 RELATED DOCUMENTS

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

2.02 SUMMARY

- A. Section includes insulating the following HVAC piping systems:
 - 1. Refrigerant suction and hot-gas piping, indoors and outdoors.

2.03 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).
- B. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use.
 - 1. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
 - 2. Jacket Materials for Pipe: 12 inches long by NPS 2.

2.04 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

2.05 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application.

2.06 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 PRODUCTS

3.01 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber, Preformed Pipe Insulation:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knauf Insulation.
 - c. Manson Insulation Inc.
 - d. Owens Corning.
 - e. Or engineer pre-approved equivalent.
 - 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Mineral-Fiber, Pipe Insulation Wicking System: Preformed pipe insulation complying with ASTM C 547, Type I, Grade A, with absorbent cloth factory-applied to the entire inside surface of preformed pipe insulation and extended through the longitudinal joint to outside surface of insulation under insulation jacket. Factory apply a white, polymer, vapor-retarder jacket with self-sealing adhesive tape seam and evaporation holes running continuously along the longitudinal seam, exposing the absorbent cloth.

3.02 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. Ramco Insulation, Inc.
 - b. Or engineer pre-approved equivalent.

3.03 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA, Inc.
 - b. Armacell LLC.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. K-Flex USA.
 - e. Or engineer pre-approved equivalent.
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Mon-Eco Industries, Inc.
 - e. Or engineer pre-approved equivalent.
- D. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Dow Corning Corporation.
- b. Johns Manville; a Berkshire Hathaway company.
- c. P.I.C. Plastics, Inc.
- d. Speedline Corporation.
- e. Or engineer pre-approved equivalent.

3.04 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Foster Brand; H. B. Fuller Construction Products.
 - b. Knauf Insulation.
 - c. Vimasco Corporation.
 - d. Or engineer pre-approved equivalent.
 2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 5. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Or engineer pre-approved equivalent.
 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
 3. Service Temperature Range: Minus 50 to plus 220 deg F.
 4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
 5. Color: White.
- D. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Eagle Bridges - Marathon Industries.
 - c. Foster Brand; H. B. Fuller Construction Products.
 - d. Knauf Insulation.
 - e. Mon-Eco Industries, Inc.
 - f. Vimasco Corporation.
 - g. Or engineer pre-approved equivalent.
 2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
 3. Service Temperature Range: Minus 20 to plus 180 deg F.
 4. Solids Content: 60 percent by volume and 66 percent by weight.
 5. Color: White.

3.05 SEALANTS

- A. Joint Sealants:
 1. Materials shall be compatible with insulation materials, jackets, and substrates.
 2. Permanently flexible, elastomeric sealant.
 3. Service Temperature Range: Minus 100 to plus 300 deg F.
 4. Color: White or gray.
- B. FSK and Metal Jacket Flashing Sealants:

1. Materials shall be compatible with insulation materials, jackets, and substrates.
 2. Fire- and water-resistant, flexible, elastomeric sealant.
 3. Service Temperature Range: Minus 40 to plus 250 deg F.
 4. Color: Aluminum.
- C. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Or engineer pre-approved equivalent.
 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250 deg F.
 5. Color: White.

3.06 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
 4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.
 5. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E 96/E 96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

3.07 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Glass-Fiber Fabric: Approximately 2 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in. for covering pipe and pipe fittings.
- B. Woven Polyester Fabric: Approximately 1 oz./sq. yd. with a thread count of 10 strands by 10 strands/sq. in., in a Leno weave, for pipe.

3.08 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. P.I.C. Plastics, Inc.
 - c. Proto Corporation.
 - d. Speedline Corporation.
 - e. Or engineer pre-approved equivalent.
 2. Adhesive: As recommended by jacket material manufacturer.
 3. Color: White.
 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- C. Metal Jacket:

1. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 - a. Factory cut and rolled to size].
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper.
 - d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- D. Self-Adhesive Outdoor Jacket: 60-mil-thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with stucco-embossed aluminum-foil facing.

3.09 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division.
 - b. Compac Corporation.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 - e. Venture Tape.
 - f. Or engineer pre-approved equivalent.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Compac Corporation.
 - b. Ideal Tape Co., Inc., an American Biltrite Company.
 - c. Venture Tape.
 - d. Or engineer pre-approved equivalent.
 2. Width: 2 inches.
 3. Thickness: 6 mils.
 4. Adhesion: 64 ounces force/inch in width.
 5. Elongation: 500 percent.
 6. Tensile Strength: 18 lbf/inch in width.

3.10 SECUREMENTS

- A. Bands:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ITW Insulation Systems; Illinois Tool Works, Inc.
 - b. RPR Products, Inc.
 - c. Or engineer pre-approved equivalent.
 - 2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal.
 - 3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- C. Wire: 0.062-inch soft-annealed, stainless steel.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. C & F Wire.
 - b. Or engineer pre-approved equivalent.

PART 3 EXECUTION

4.01 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 - 1. Verify that systems to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

4.02 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

4.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.

- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
 - a. For below-ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above-ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.

4.04 PENETRATIONS

- A. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 - 4. Seal jacket to wall flashing with flashing sealant.

- B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated):
Install insulation continuously through walls and partitions.

4.05 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
 - 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 - 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 - 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 - 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 - 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 - 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 - 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
 - 1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 - 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
 - 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.

4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

4.06 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Insulation Installation on Straight Pipes and Tubes:
 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
 3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
 4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Flanges:
 1. Install preformed pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
 4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.
- C. Insulation Installation on Pipe Fittings and Elbows:
 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
- D. Insulation Installation on Valves and Pipe Specialties:
 1. Install preformed sections of same material as straight segments of pipe insulation when available.
 2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
 3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 4. Install insulation to flanges as specified for flange insulation application.

4.07 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.
 1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

4.08 FINISHES

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

- B. Do not field paint aluminum jackets.

4.09 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 - 1. Drainage piping located in crawl spaces.
 - 2. Underground piping.
 - 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

4.10 INDOOR PIPING INSULATION SCHEDULE

- A. Condensate and Equipment Drain Water below 60 Deg F:
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1/2 inch thick.
- B. Refrigerant Suction and Hot-Gas Piping:
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 1/2 inch thick.

4.11 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

- A. Refrigerant Suction and Hot-Gas Piping:
 - 1. All Pipe Sizes: Insulation shall be the following:
 - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 2 inches thick.

4.12 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:
 - 1. PVC: 20 mils thick.

4.13 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed: Refrigerant Piping
 - 1. PVC: 30 mils thick.

END OF SECTION

**SECTION 230800
COMMISSIONING OF HVAC**

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers the Contractor's responsibilities for total project commissioning; each subcontractor or installer responsible for the installation of a particular system or equipment item to be commissioned is responsible for the commissioning activities relating to that system or equipment item.
- B. The Commissioning Authority (CA) directs and coordinates all commissioning activities and provides Prefunctional Checklists and Functional Test Procedures for Contractor's use.
- C. **The Commissioning Authority (CA) has been hired by the owner.**
- D. The following HVAC equipment is to be commissioned: CRAC units and associated equipment.
- E. The Prefunctional Checklist and Functional Test requirements specified in this section are in addition to, not a substitute for, inspection or testing specified in other sections.

1.02 RELATED REQUIREMENTS

- A. Section 017800 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.
- B. Section 017900 - Demonstration and Training: Scope and procedures for Owner personnel training.
- C. Section 230593 - Testing, Adjusting, and Balancing for HVAC.

1.03 SUBMITTALS

- A. Updated Submittals: Keep the Commissioning Authority informed of all changes to control system documentation made during programming and setup; revise and resubmit when substantial changes are made.
- B. DRAFT Prefunctional Checklists and Functional Test Procedures for Control System shall be provided to the contractor by the CA: Detailed written plan indicating the procedures to be followed to test, checkout and adjust the control system prior to full system Functional Testing; include at least the following for each type of equipment controlled:
 - 1. System name.
 - 2. List of devices.
 - 3. Step-by-step procedures for testing each controller after installation, including:
 - a. Process of verifying proper hardware and wiring installation.
 - b. Process of downloading programs to local controllers and verifying that they are addressed correctly.
 - c. Process of performing operational checks of each controlled component.
 - d. Plan and process for calibrating valve and damper actuators and all sensors.
 - e. Description of the expected field adjustments for transmitters, controllers and control actuators should control responses fall outside of expected values.
 - 4. Copy of proposed log and field checkout sheets to be used to document the process; include space for initial and final read values during calibration of each point and space to specifically indicate when a sensor or controller has "passed" and is operating within the contract parameters.
 - 5. Description of the instrumentation required for testing.
 - 6. Indicate what tests on what systems should be completed prior to TAB using the control system for TAB work. Coordinate with the Commissioning Authority and TAB contractor for this determination.
- C. Startup Reports, Prefunctional Checklists, and Trend Logs: Submit for approval of Commissioning Authority.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required functional performance testing; unless otherwise noted such testing equipment will NOT become the property of Owner.

PART 3 EXECUTION

3.01 PREPARATION

- A. Cooperate with the Commissioning Authority in development of the Prefunctional Checklists and Functional Test Procedures.
- B. Furnish additional information requested by the Commissioning Authority.
- C. Put all HVAC equipment and systems into operation and continue operation during each working day of testing, adjusting, and balancing and commissioning, as required.

3.02 INSPECTING AND TESTING - GENERAL

- A. Submit startup plans, startup reports, and Prefunctional Checklists for each item of equipment or other assembly to be commissioned.
- B. Perform the Functional Tests directed by the Commissioning Authority for each item of equipment or other assembly to be commissioned.
- C. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

3.03 TAB COORDINATION

- A. TAB: Testing, adjusting, and balancing of HVAC.
- B. Coordinate commissioning schedule with TAB schedule.
- C. Review the TAB plan to determine the capabilities of the control system toward completing TAB.
- D. Provide a qualified control system technician to operate the controls to assist the TAB technicians or provide sufficient training for the TAB technicians to operate the system without assistance.

3.04 CONTROL SYSTEM FUNCTIONAL TESTING

- A. Prefunctional Checklists for control system components will require a signed and dated certification that all system programming is complete as required to accomplish the requirements of the Contract Documents and the detailed Sequences of Operation documentation submittal.
- B. Do not start Functional Testing until all controlled components have themselves been successfully Functionally Tested in accordance with the contract documents.
- C. Using a skilled technician who is familiar with this building, execute the Functional Testing of the control system as required by the Commissioning Authority.
- D. Functionally Test integral or stand-alone controls in conjunction with the Functional Tests of the equipment they are attached to, including any interlocks with other equipment or systems; further testing during control system Functional Test is not required unless specifically indicated below.
- E. Demonstrate the following to the Commissioning Authority during testing of controlled equipment; coordinate with commissioning of equipment.
 - 1. Setpoint changing features and functions.
 - 2. Sensor calibrations.
- F. Demonstrate to the Commissioning Authority:
 - 1. That all specified functions and features are set up, debugged and fully operable.
 - 2. That scheduling features are fully functional and setup, including holidays.
 - 3. That all graphic screens and value readouts are completed.

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4. Correct date and time setting in central computer.
 5. Global commands features.
 6. Communications to remote sites.
 7. Fire alarm interlocks and response.
 8. Fire protection and suppression systems interfaces.
 9. That points that are monitored only, having no control function, are reporting properly to the control system.
 10. All control strategies and sequences not tested during controlled equipment testing.
 11. Trend logging and graphing features that are specified.
 12. Other integrated tests specified in the contract documents
 13. That control system features that are included but not specified to be setup are actually installed.
- G. If the control system, integral control components, or related equipment do not respond to changing conditions and parameters appropriately as expected, as specified and according to acceptable operating practice, under any of the conditions, sequences, or modes tested, correct all systems, equipment, components, and software required at no additional cost to Owner.

END OF SECTION

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**SECTION 232300
REFRIGERANT PIPING**

REFRIGERANT PIPING

PART 1 GENERAL

2.01 RELATED DOCUMENTS

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

2.02 SUMMARY

- A. Section Includes:
 - 1. Refrigerant pipes and fittings.
 - 2. Refrigerant piping valves and specialties.
 - 3. Refrigerants.

2.03 ACTION SUBMITTALS

- A. Product Data: For each type of valve and refrigerant piping specialty.
 - 1. Include pressure drop, based on manufacturer's test data, for the following:
 - a. Thermostatic expansion valves.
 - b. Solenoid valves.
 - c. Hot-gas bypass valves.
 - d. Filter dryers.
 - e. Strainers.
 - f. Pressure-regulating valves.
- B. Shop Drawings:
 - 1. Show piping size and piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.
 - 2. Show interface and spatial relationships between piping and equipment.
 - 3. Shop Drawing Scale: 1/4 inch equals 1 foot.

2.04 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

2.05 QUALITY ASSURANCE

- A. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- B. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

2.06 PRODUCT STORAGE AND HANDLING

- A. Store piping with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 PRODUCTS

3.01 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
 - 1. Suction Lines for Air-Conditioning Applications: 300 psig.
 - 2. Hot-Gas and Liquid Lines: 535 psig.

3.02 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.

- D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- E. Brazing Filler Metals: AWS A5.8/A5.8M.
- F. Flexible Connectors:
 - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
 - 2. End Connections: Socket ends.
 - 3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
 - 4. Working Pressure Rating: Factory test at minimum 500 psig.
 - 5. Maximum Operating Temperature: 250 deg F.

3.03 VALVES AND SPECIALTIES

- A. Diaphragm Packless Valves:
 - 1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
 - 2. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
 - 3. Operator: Rising stem and hand wheel.
 - 4. Seat: Nylon.
 - 5. End Connections: Socket, union, or flanged.
 - 6. Working Pressure Rating: 500 psig.
 - 7. Maximum Operating Temperature: 275 deg F.
- B. Check Valves:
 - 1. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
 - 2. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
 - 3. Piston: Removable polytetrafluoroethylene seat.
 - 4. Closing Spring: Stainless steel.
 - 5. End Connections: Socket, union, threaded, or flanged.
 - 6. Maximum Opening Pressure: 0.50 psig.
 - 7. Working Pressure Rating: 500 psig.
 - 8. Maximum Operating Temperature: 275 deg F.
- C. Service Valves:
 - 1. Body: Forged brass with brass cap including key end to remove core.
 - 2. Core: Removable ball-type check valve with stainless-steel spring.
 - 3. Seat: Polytetrafluoroethylene.
 - 4. End Connections: Copper spring.
 - 5. Working Pressure Rating: 500 psig.
- D. Safety Relief Valves: Comply with 2010 ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
 - 1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
 - 2. Piston, Closing Spring, and Seat Insert: Stainless steel.
 - 3. Seat: Polytetrafluoroethylene.
 - 4. End Connections: Threaded.
 - 5. Working Pressure Rating: 400 psig.
 - 6. Maximum Operating Temperature: 240 deg F.
- E. Thermostatic Expansion Valves: Comply with AHRI 750.
 - 1. Body, Bonnet, and Seal Cap: Forged brass or steel.
 - 2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
 - 3. Packing and Gaskets: Non-asbestos.
 - 4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
 - 5. Suction Temperature: 40 deg F.
 - 6. Superheat: Adjustable.
 - 7. End Connections: Socket, flare, or threaded union.

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8. Working Pressure Rating: 700 psig.
- F. Hot-Gas Bypass Valves: Comply with UL 429; listed and labeled by an NRTL.
 1. Body, Bonnet, and Seal Cap: Ductile iron or steel.
 2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
 3. Packing and Gaskets: Non-asbestos.
 4. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
 5. Seat: Polytetrafluoroethylene.
 6. Equalizer: Internal.
 7. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter and 24-V ac coil. Provide transformer as required.
 8. End Connections: Socket.
 9. Throttling Range: Maximum 5 psig.
 10. Working Pressure Rating: 500 psig.
 11. Maximum Operating Temperature: 240 deg F.
- G. Straight-Type Strainers:
 1. Body: Welded steel with corrosion-resistant coating.
 2. Screen: 100-mesh stainless steel.
 3. End Connections: Socket or flare.
 4. Working Pressure Rating: 500 psig.
 5. Maximum Operating Temperature: 275 deg F.
- H. Angle-Type Strainers:
 1. Body: Forged brass or cast bronze.
 2. Drain Plug: Brass hex plug.
 3. Screen: 100-mesh monel.
 4. End Connections: Socket or flare.
 5. Working Pressure Rating: 500 psig.
 6. Maximum Operating Temperature: 275 deg F.
- I. Moisture/Liquid Indicators:
 1. Body: Forged brass.
 2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
 3. Indicator: Color coded to show moisture content in parts per million (ppm).
 4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
 5. End Connections: Socket or flare.
 6. Working Pressure Rating: 500 psig.
 7. Maximum Operating Temperature: 240 deg F.
- J. Replaceable-Core Filter Dryers: Comply with AHRI 730.
 1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
 2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
 3. Desiccant Media: Activated alumina.
 4. End Connections: Socket.
 5. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
 6. Maximum Pressure Loss: 2 psig.
 7. Working Pressure Rating: 500 psig.
 8. Maximum Operating Temperature: 240 deg F.
- K. Receivers: Comply with AHRI 495.
 1. Comply with UL 207; listed and labeled by an NRTL.
 2. Body: Welded steel with corrosion-resistant coating.
 3. Tappings: Inlet, outlet, liquid level indicator, and safety relief valve.
 4. End Connections: Socket or threaded.

5. Working Pressure Rating: 500 psig.
6. Maximum Operating Temperature: 275 deg F.
- L. Liquid Accumulators: Comply with AHRI 495.
 1. Body: Welded steel with corrosion-resistant coating.
 2. End Connections: Socket or threaded.
 3. Working Pressure Rating: 500 psig.
 4. Maximum Operating Temperature: 275 deg F.

3.04 REFRIGERANTS

- A. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.
- B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Atofina Chemicals, Inc.
 2. DuPont Company; Fluorochemicals Div.
 3. Honeywell, Inc.; Genetron Refrigerants.
 4. INEOS Fluor Americas LLC.
 5. Or engineer pre-approved equivalent.

PART 3 EXECUTION

4.01 PIPING APPLICATIONS FOR REFRIGERANT R-410A

- A. Suction Lines NPS 3-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
- B. Hot-Gas and Liquid Lines: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with Alloy HB soldered joints.
- C. Safety-Relief-Valve Discharge Piping: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with 95-5 tin-antimony soldered joints.

4.02 VALVE AND SPECIALTY APPLICATIONS

- A. Install diaphragm packless valves in suction and discharge lines of compressor.
- B. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.
- C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.
- D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.
- E. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.
- F. Install thermostatic expansion valves as close as possible to distributors on evaporators.
 1. Install valve so diaphragm case is warmer than bulb.
 2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line. Verify proper location of installation with valve manufacturer.
 3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- G. Install safety relief valves where required by 2010 ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.
- H. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
- I. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for the device being protected:
 1. Solenoid valves.
 2. Thermostatic expansion valves.

- 3. Hot-gas bypass valves.
- 4. Compressor.
- J. Install filter dryers in liquid line between compressor and thermostatic expansion valve.
- K. Install receivers sized to accommodate pump-down charge as required.
- L. Install flexible connectors at compressors.

4.03 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping adjacent to machines to allow service and maintenance.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Select system components with pressure rating equal to or greater than system operating pressure.
- I. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- J. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection.
- K. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- L. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Liquid lines may be installed level.
- M. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- N. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- O. Identify refrigerant piping and valves according to Section 23 05 53 "Identification for HVAC Piping and Equipment."
- P. Install sleeves for piping penetrations of walls, ceilings, and floors.
- Q. Install sleeve seals for piping penetrations of concrete walls and slabs.

4.04 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

- D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
 - 1. Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.
 - 2. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.
- E. Welded Joints: Construct joints according to AWS D10.12M/D10.12.

4.05 HANGERS AND SUPPORTS

- A. Install the following pipe attachments:
 - 1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
 - 2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
 - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 - 4. Spring hangers to support vertical runs.
 - 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- B. Install hangers for copper tubing with the following maximum spacing and minimum rod diameters:
 - 1. NPS 1/2: Maximum span, 60 inches; minimum rod, 1/4 inch.
 - 2. NPS 5/8: Maximum span, 60 inches; minimum rod, 1/4 inch.
 - 3. NPS 1: Maximum span, 72 inches; minimum rod, 1/4 inch.
 - 4. NPS 1-1/4: Maximum span, 96 inches; minimum rod, 3/8 inch.
 - 5. NPS 1-1/2: Maximum span, 96 inches; minimum rod, 3/8 inch.
 - 6. NPS 2: Maximum span, 96 inches; minimum rod, 3/8 inch.
 - 7. NPS 2-1/2: Maximum span, 108 inches; minimum rod, 3/8 inch.

4.06 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Comply with ASME B31.5, Chapter VI.
 - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
 - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.
 - a. Fill system with nitrogen to the required test pressure.
 - b. System shall maintain test pressure at the manifold gage throughout duration of test.
 - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

4.07 SYSTEM CHARGING

- A. Charge system using the following procedures:
 - 1. Install core in filter dryers after leak test but before evacuation.
 - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
 - 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
 - 4. Charge system with a new filter-dryer core in charging line.

4.08 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning controllers to the system design temperature.

- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
 - 1. Open shutoff valves in condenser water circuit.
 - 2. Verify that compressor oil level is correct.
 - 3. Open compressor suction and discharge valves.
 - 4. Open refrigerant valves except bypass valves that are used for other purposes.
 - 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION

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SECTION 238123.12
COMPUTER-ROOM AIR-CONDITIONERS, FLOOR-MOUNTED UNITS (7 TONS (25 KW) AND LARGER)

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes floor-mounted, computer-room air conditioners of 7 tons and larger.

1.03 DEFINITIONS

- A. COP: Coefficient of performance.
- B. EER: Energy efficiency ratio.
- C. SCR: Silicon controlled rectifier.

1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include material descriptions, dimensions of individual components and profiles, and finishes for computer-room air-conditioning units.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For computer-room air conditioners.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.

1.05 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For computer-room air conditioners to include in emergency, operation, and maintenance manuals.

1.07 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of computer-room air conditioners that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.
 - 2. Warranty Period for Humidifiers: Manufacturer's standard, but not less than three years from date of Substantial Completion.
 - 3. Warranty Period for Control Boards: Manufacturer's standard, but not less than three years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Liebert; a brand of Emerson Electric Co.
 - 2. Engineer pre-approved equal.

2.02 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance:
 - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
- C. ASME Compliance: Fabricate and label water-cooled condenser shell to comply with ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," Division 1.

2.03 MANUFACTURED UNITS

- A. Description: Self-contained, factory assembled, prewired, and prepiped; consisting of cabinet, fan, filters, and controls; for vertical floor mounting in upflow or downflow configuration.
- B. Cabinet and Frame: Welded tubular-steel frame with removable single-thick steel panels and insulated with 1-inch-thick duct liner.
 - 1. Floor Stand: Welded tubular steel, 4 inches high, with adjustable legs and vibration isolation pads with turning vanes mounted within the stand.
 - 2. Unit with two-way, powder-coated insulated air distribution plenum.
- C. Supply-Air Fan:
 - 1. Plug/plenum, single inlet, direct drive, electronically commutated, and variable speed. Fan shall also be capable of operating within the cooling cabinet instead of under the floor.
- D. Refrigeration System:
 - 1. Compressor: Digital scroll, variable capacity with oil strainer, internal motor overload protection, resilient suspension system with vibration isolators, and crankcase heater. Compressor motor shall be suction gas cooled. (4-step semihermetic compressor with 25-100% turndown is also acceptable.)
 - a. Compressors shall be located outside the airstream and shall be removable and serviceable from the front of the unit.
 - b. Each compressor circuit shall be connected to the full-face area of the evaporator coil.
 - 2. Refrigeration Circuit:
 - a. Two independent circuits with hot-gas mufflers (mufflers for semihermetic only).
 - b. Low-pressure switch.
 - c. Manually reset, high-pressure switch.
 - d. Thermal-expansion valve with external equalizer.
 - e. Sight glass with moisture indicator.
 - f. Service shutoff valves.
 - g. Charging valves.
 - h. Hot-gas bypass.
 - i. Refrigerant charge.
 - 3. Refrigerant: R-410A.
 - 4. Refrigerant Evaporator Coil: Direct-expansion coil of seamless copper tubes expanded into aluminum fins, with two circuits, each with solenoid valve.
 - a. Maximum face velocity of 450 ft. per minute at full unit CFM.
 - b. Mount stainless-steel drain pan complying with ASHRAE 62.1 under coil assembly.
 - 5. Remote Air-Cooled Refrigerant Condenser:
 - a. Integral, copper-tube aluminum-fin coil.
 - b. Condenser with transient voltage surge suppression and locking disconnect in the enclosed electrical panel section.
 - c. Condenser shall balance the heat rejection of the compressor at 100F ambient.
 - 6. Fans: Multiple direct-drive, single-speed propeller type.
 - 7. Split system shall have suction- and liquid-line compatible fittings and refrigerant piping for field interconnection.

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- E. Electric-Resistance Reheat Coil: Unit shall include a factory-installed reheat to control temperature during dehumidification. The electric reheat coils shall be low watt density, 304/304 stainless steel fin tubular construction, protected by thermal safety switches, shall be 15 kW controlled in three stages.
- F. Final Filter: 4-inch-thick, disposable, pleated, glass-fiber media.
 - 1. Final Filter MERV Rating: 8 according to ASHRAE 52.2.
- G. Infrared type Humidifier: Consisting of high-intensity quartz lamps mounted above and out of the water supply. The humidifier pan shall be stainless steel and arranged to be removable without disconnecting high-voltage electrical connections. The complete humidifier section shall be pre-piped, ready for field connection to the water supply. The humidifier shall be equipped with an automatic water supply system and shall have an adjustable water-overfeed to prevent mineral precipitation. A high-water detector shall shut down the humidifier to prevent overflowing. A factory provided air gap shall prevent backflow of the humidifier supply water.
- H. Disconnect Switch: Locking disconnect with handle accessible with the door closed.
- I. Control System:
 - 1. Microprocessor unit-mounted panel.
 - 2. Fan contactor.
 - 3. Compressor contactor.
 - 4. Compressor start capacitor.
 - 5. Control transformer with circuit breaker.
 - 6. Solid-state temperature- and humidity-control modules.
 - 7. Humidity contactor.
 - 8. Time-delay relay.
 - 9. Heating contactor.
 - 10. Smoke sensor.
 - 11. High-temperature thermostat.
 - 12. Solid-state, wall-mounted control panel with start-stop switch, adjustable humidity set point, remote temperature sensors remote humidity sensors and adjustable temperature set point.
 - 13. Remote panel to monitor and change temperature and humidity set points and sensitivities of the unit and unit alarms.
 - 14. Sequential load activation and self-diagnostics.
- J. Fan Motors:
 - 1. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."
 - 2. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load does not require motor to operate in service factor range above 1.0.
 - 3. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
 - 4. Type: Open dripproof.
- K. Low voltage terminal package: Factory-installed and wired terminals shall be provided for customer connection to lock out the reheat and humidifier upon contact closure. Two (2) extra N/O common alarm contacts shall be provided. Two (2) extra remote shutdown terminals shall be provided.
- L. **Provide cottonwood screens for air cooled condensers by Permatron Prevent screens or engineer pre-approved equivalent.**

2.04 CAPACITIES AND CHARACTERISTICS: SEE SCHEDULE ON DRAWINGS.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for plumbing piping systems to verify actual locations of piping connections before equipment installation.
- C. Examine walls, floors, and roofs for suitable conditions where computer-room air conditioners will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install computer-room air conditioners coordinated with existing mechanical room equipment clearance requirements.
- B. Install computer-room air conditioners level and plumb, maintaining manufacturer's recommended clearances.
- C. Computer-Room Air-Conditioner Mounting: Install using elastomeric pads elastomeric mounts.
 - 1. Minimum Deflection: 1/4 inch.
- D. Air-Cooled Refrigerant Condenser Mounting: Install using restrained spring isolators on rails to sit on existing membrane roof.
 - 1. Minimum Deflection: 1 inch.

3.03 CONNECTIONS

- A. Piping installation requirements are specified in other heating, ventilating, and air-conditioning Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to computer-room air conditioners, allow space for service and maintenance.
- C. Water and Drainage Connections: Provide adequate connections for condensate drain and humidifier flushing system.
- D. Refrigerant Piping: Comply with applicable requirements in Section 23 23 00 "Refrigerant Piping." Provide shutoff valves and piping.

3.04 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Inspect for and remove shipping bolts, blocks, and tie-down straps.
 - 2. After installing computer-room air conditioners and after electrical circuitry has been energized, test for compliance with requirements.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Computer-room air conditioners will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.
- D. After startup service and performance test, change filters and flush humidifier.

3.05 ADJUSTING

- A. Adjust initial temperature and humidity set points.
- B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

- C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project for this purpose.

3.06 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain computer-room air conditioners.
- B. Provide agenda to owner a minimum of 1 week prior to training taking place.

END OF SECTION

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**SECTION 260500
COMMON WORK RESULTS FOR ELECTRICAL**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract apply to this Section.

1.02 SUMMARY

- A. Section Includes:
1. Basic Requirements.
 2. Detailed Requirements.
 3. Demolition Requirements.
 4. Coordination.
 5. Quality Assurance.
 6. Codes, Ordinances, & Permits.
 7. Common requirements for electrical installation.
 8. Painting.
 9. Cleaning & Rubbish

1.03 SUBMITTALS

- A. Shop Drawings:
1. Submit shop drawings, wiring diagrams, and descriptive literature on all equipment furnished in this contract. Contractor shall "approve" shop drawings as specified in Division 1 prior to submitting to Engineer for approval. Shop drawing submittals shall comply with Division 1 requirements.
 2. Make submittals as soon as practicable after the signing of the contract. Shipment shall not be released until drawings and literature have been finally approved.
 3. Shop drawings shall be checked by the Contractor for shape, dimensions, and details of attachment to the construction before submittal. Submitted shop drawings will be presumed to have been so checked by the Contractor.
 4. The literature shall be complete, giving materials, gauges, weights, finishes, etc.
 5. Number of copies required is the number of copies the Contractor desires returned, or the quantity listed in Division 1, whichever is greater.
 6. Wiring diagrams shall be furnished for all communication and control systems under this contract.
 7. In addition to the foregoing, the Contractor is to supply to the Construction Manager, for delivery to the Owner, bound in a single set, a complete shop drawing portfolio of all equipment indicated under the specific specification section. Submit these near completion of the project arranged and indexed according to the CSI format.
- B. Test reports: Submit written installation test reports for review and approval immediately after testing has been satisfactorily completed.
- C. Acceptance certificates: Submit written manufacturer, testing agency and/or Code authority acceptance certificates with project closeout documentation.
- D. Warranty: Submit a written warranty statement detailing all system and equipment warranties. Warranties shall be signed by Submittal section and are not required for this Section.
- E. Operation & Maintenance Instructions:
1. Refer to Division 1 for submittal and training requirements.
 2. Furnish approved operation and maintenance instruction booklets covering each listed item of equipment installed under this contract. These booklets shall provide complete instructions on the proper operation, use and periodic maintenance, together with the source of replacement parts and service for the item of equipment covered.
 3. Operation and maintenance manuals shall include copies of test reports, acceptance certificates and warranty information.
 4. In addition to the foregoing, the Contractor shall demonstrate to the Owner's designated personnel the use of the systems listed herein and shall furnish three (3) typewritten

- copies of a general operation procedure. Include locations and functions of switches, circuit breakers, fuses, etc.
5. After final acceptance of all work and occupancy of the building, the Contractor shall have on the job, a qualified representative to make final adjustments of electrical systems and to instruct the Owner's representative in operating procedures, adjustment, and maintenance of system components, and to acquaint the Owner's representative with locations and functions of circuit breakers, fuses, switches, control devices, etc.
- F. Record Drawings:
1. Refer to Division 1 for submittal requirements.
 2. Record actual locations of equipment, devices, routing of conduits and locations of pull boxes for the following facilities:
 - a. All branch circuit wiring
 - b. Empty conduits for use by others
 3. The information shall be neatly marked and the prints delivered to the Architect.
- G. Contractor's Warranty:
1. All work shall be warranted to be free of defects and to function properly for one year from the date of substantial completion. Defects appearing within the warranty period shall be repaired to the satisfaction of the Architect/Engineer. Refer to Division 1 for additional requirements.
 2. The warranty shall not obligate the Contractor for failure resulting from accident or from improper operation or care on the part of the Owner.

1.04 BASIC REQUIREMENTS

- A. Discrepancies: Whenever a discrepancy or inconsistency exists between related information indicated on the contract drawings and/or specifications (such as differences between product descriptions and catalog numbers) this contractor shall obtain additional clarification and direction from the Architect/Engineer before proceeding.
- B. Deficiencies: The Contractor and subcontractors shall resolve all known deficiencies and inadvertent omissions, including non-compliance with applicable codes, with the Architect/Engineer prior to ordering materials or proceeding with the work. Any work performed prior to receipt of instruction from the Architect/Engineer will be done so at the Contractor's risk.
- C. Manufacturer's Catalog Numbers: Product series, model, or catalog numbers, whether indicated on drawings or specifications, shall not be considered complete. This Contractor shall not order any product based solely upon the stated catalog number. Furnish products including accessories and options necessary to match the full product description and its intended purpose and application based on all information available from the contract documents.

1.05 DETAILED REQUIREMENTS

- A. Equipment and material specifications are minimum general requirements.
- B. In cases where construction requirements and/or special features not mentioned are stated in subsequent sections, on the drawings, or by loc Code, the higher standard shall apply.
- C. Coordinate rough-in work and other electrical provisions for temperature sensors, CO2 sensors, humidistats, thermostats, and other wall-mounted BMS wired devices shown on the mechanical drawings. Refer to the mechanical plans and the mechanical symbols list to identify such items. Install a double-gang junction box with a single-gang plaster ring with ¾-inch conduit to above accessible ceiling, unless otherwise indicated on mechanical drawings or specifications. Coordinate exact requirements with the contractor providing the wired device.
- D. Electrical installations shall not hinder the regular maintenance of or replacement of mechanical equipment. Conduit and cable trays shall not be installed beneath suspended mechanical units. Coordinate and plan installations.

1.06 DEMOLITION REQUIREMENTS

- A. A site visit will not be mandatory for a bid submittal.
- B. Remove, relocate, and extend existing installations to accommodate new construction on existing project site.

- C. Existing unused wiring shall be removed under this contract. Unused wiring shall be regarded as scrap materials to be recycled by this Contractor. Scrap value shall be determined by the Contractor and accounted for in the Contractor's bid. The Owner reserves the right to identify which items shall be salvaged-and, thus, carefully removed by this Contractor and placed in storage on site as directed by the Owner. The Contractor shall be responsible for the proper disposal of all demolished materials that the Owner does not want to salvage.
- D. Verify that abandoned wiring and equipment serve only abandoned equipment or facilities. Extend conduit and wire to facilities, equipment, light poles, etc. that remain in operation. Extension of conduit and wire to equipment shall be compatible with the surrounding area.
 - 1. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel and/or junction boxes as appropriate.
 - 2. Remove exposed abandoned conduit and raceway, including abandoned conduit and raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces. Remove all associated clamps, hangers, supports, etc. associated with raceway removal.
 - 3. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
 - 4. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

1.07 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, cable trays, and wireways will be clear of obstructions and of the working and access space of other equipment.
- B. Prior to bidding, this contractor shall determine conduit routings, including the means and methods of installation, maximum feeder/branch-circuit lengths, pull boxes, junction boxes, conduit bodies, fittings, and any other related work in accordance with the contract documents and the applicable building codes.

1.08 QUALITY ASSURANCE

- A. Test Equipment Suitability and Calibration: Comply with NETA ATS, "Suitability of Test Equipment" and "Test Instrument Calibration."
- B. Tests & Adjustments
 - 1. Contractor shall perform at his own expense, except for electrical energy, any tests that the Architect/Engineer may order to prove the performance of any device(s) and/or equipment supplied under this contract.
 - 2. Such tests will be limited to non-destructive test and will involve only direct reading(s) of the parameter(s) involved, i.e., actual trip rating or time delay of a circuit breaker may be required but coordination study is beyond the scope of this requirement.
 - 3. Provide adjustments such as branch circuit re-arranging, circuit breaker trip settings, final selection of fuse sizes, motor starter overload element settings, and the like that may be indicated by the tests and/or to suit equipment to be installed.

1.09 CODES, ORDINANCES, & PERMITS

- A. All governmental codes and ordinances that are applicable and in effect at the time and location of this work are hereby referenced as an integral part of the specification to establish minimum standards of design detail, materials, and workmanship. Extra payment will not be allowed for work or changes required by code enforcement authorities and/or utility companies. This is not to preclude the establishment of non-conflicting higher standards as may be specified herein and/or indicated on the drawings. In case of conflict between any of the standards established herein and a governmental code or ordinance, refer to the

Architect/Engineer and obtain instructions before proceeding with the work involved.

- B. Apply for, obtain, and pay for required permits and certificates of inspection

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. In all Division 26 Part 2 articles where titles introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified or engineering pre-approved product substitution. No product manufacturer will be accepted after this bid unless approved through a contractual change or written acceptance by Engineer. See "Substitution Procedures" article herein.

2.02 PROPRIETARY REFERENCES

- A. Except where there is indication to the contrary, the intent of this specification is to be open to all brand names and suppliers that offer equipment that complies with the stated requirements of capacity, function, quality configuration, size, shape, and operating characteristics that are compatible with the design objectives of the system and interfacing equipment.
- B. The perceived operational limitations and maintenance requirements as well as the availability of suitable maintenance support will be evaluated in comparison to competing equipment as an important factor in deciding if an item of equipment is acceptable or not acceptable.
- C. The product manufacturers listed are manufacturers that are believed to be producers of like equipment or materials and locally represented, with service capability and otherwise meeting the requirements of the contract documents. Reference to a brand name is not to be construed as a representation that the named supplier actually has available the equipment or materials that meet the detailed requirements of the contract documents.
- D. Details of construction, control, or operation that are proprietary and not significant to the Owner's utilization of the equipment will not be used as a basis for qualifying or disqualifying any equipment.

2.03 SUBSTITUTIONS

- A. 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.
- B. No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Engineer at least 7 days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the work including changes in the work of other contracts that incorporation of the proposed substitution would require shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Engineer's decision of approval or disapproval of a proposed substitution shall be final. Refer to Division 1 for additional requirements.
- C. If the 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.
- D. No substitutions will be considered after the contract award unless specifically provided in the contract documents.

2.04 UL LABEL

- A. All materials, devices, etc. installed under this contract shall bear the UL label, or be UL listed as applicable except those specified items not covered by existing UL Standards.

PART 3 EXECUTION

3.01 REBATES

- A. The work of this contract may include equipment, controls or systems to be furnished and/or installed that qualify for rebate(s) under local utility company energy conservation and efficiency programs.
- B. In such instance(s), the Contractor shall cooperate with the Owner by providing information and filings as necessary for the Owner to receive the rebate(s).

3.02 INSPECTION OF SITE

- A. Determine information regarding existing construction by the site inspection prior to bidding.
- B. By submitting a bid for this work, contractor agrees he has inspected the existing site and familiarized himself with existing conditions and how they relate to the contract documents.

3.03 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Examine the site and drawings before proceeding with the layout and installation of this work. Locate work so it does not interfere with access to service for any equipment.
- B. Obtain and follow manufacturer's installation instructions in the installation of all electrical equipment. Observe all restrictions imposed by the equipment manufacturer, UL label, NEC, or other applicable code in regard to setting; anchoring; hanging; clearances; electric, magnetic or thermal separation; shielding; weather and moisture protection. In case of conflict between the specifications herein and instructions or code governing the installation, notify the Engineer and receive his instructions before proceeding.
- C. Arrange exposed work as closely as practicable to wall or ceiling surfaces and in accurate alignment with exposed features of structure and/or trim. Locate concealed work so fittings, connectors, and other projections will clear surfaces. Where the option of more than one material is given, selection shall be confined to those which may be properly installed.
- D. Install all work in a neat and workmanlike manner by workmen thoroughly qualified in the trade or duties they are to perform. Rough work will be rejected.
- E. The Contractor is responsible for correct size and location of chases, slots, and openings require and will be liable for any cutting or patching made necessary by his failure to make proper arrangements in this respect.
- F. Maintain a competent full-time superintendent on the job to oversee and coordinate work with other trades, receive instructions from the Architect/Engineer, make layout of work to suit actual conditions, and to satisfy requirements of the drawings, specifications, and good workmanship.

3.04 PAINTING

- A. Exposed electrical work in finished areas, walls, ceilings, etc. will be painted by the Electrician.
- B. Exposed electrical work in unfinished areas will not require painting unless so noted.
- C. Protect the manufacturer's finish on equipment that is so finished. Clean and/or touch-up as necessary to repair damage at the end of the job.
- D. Paint exposed work installed under this contract with suitable primer and two coats of approved enamel, colors as specified or directed.
- E. Protect the manufacturer's finish on equipment that is so finished. Clean and/or touch-up as necessary to repair damage at the end of the job.

3.05 CLEANING & RUBBISH

- A. During the work, keep the premises clear of unnecessary accumulation of debris.
- B. Plug or cap open ends of conduits to prevent the entrance of dirt and/or moisture during construction. Protect boxes, panel enclosures, etc. against the entrance of mortar, plaster, moisture, and other foreign material during construction, and thoroughly clean these spaces before pulling wires, and again, if necessary, before installing covers of fronts.

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- C. On completion of the work, remove all rubbish and debris resulting from the work or the work of subcontractors and dispose of same.
- D. All equipment, fixtures, etc. shall be thoroughly cleaned of accumulated dust, plaster, or other dirt and left in a satisfactory condition for use.

END OF SECTION

SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Wiring connectors.
- C. Electrical tape.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

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.

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.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.
- H. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG.
- I. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.

- c. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor Stranding:
 - 1. Feeders and Branch Circuits: Stranded.
 - 2. Control Circuits: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
 - a. Installed Underground: Type XHHW-2.

2.04 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.

2.05 ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).

PART 3 EXECUTION

3.01 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. Arrange circuiting to minimize splices.
 - 3. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
- 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.
- G. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
- H. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

- I. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- J. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
- K. 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.
- L. Insulate ends of spare conductors using vinyl insulating electrical tape.
- M. Install firestopping to preserve fire resistance rating of partitions and other elements.
- N. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

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SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

1.02 SUBMITTALS

- A. Field quality control test reports.

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.
- 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. Grounding System Resistance:
 - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Engineer. Precipitation within the previous 48 hours does not constitute normally dry conditions.
 - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
- F. Separately Derived System Grounding:
 - 1. Separately derived systems include, but are not limited to:
 - a. Transformers (except autotransformers such as buck-boost transformers).
 - 2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
 - 3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
 - 4. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
 - 5. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.
- G. 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.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 260553.

3.02 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.13.
- C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

- E. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION

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**SECTION 260529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

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.

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 5. 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. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. 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.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
- D. 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.
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
- F. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.01 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. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- E. 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.
- F. Secure fasteners according to manufacturer's recommended torque settings.
- G. Remove temporary supports.

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. Aluminum rigid metal conduit (RMC).
- C. PVC-coated galvanized steel rigid metal conduit (RMC).
- D. Electrical metallic tubing (EMT).
- E. Rigid polyvinyl chloride (PVC) conduit.
- F. Liquidtight flexible nonmetallic conduit (LFNC).
- G. Conduit fittings.

1.02 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S).
- C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit -- Aluminum (ERMC-A).
- D. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC).
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- F. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT).
- G. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit.
- H. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC).
- I. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable.
- J. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- K. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit.
- L. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.
- M. NFPA 70 - National Electrical Code.
- N. UL 6 - Electrical Rigid Metal Conduit-Steel.
- O. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel.
- P. UL 514B - Conduit, Tubing, and Cable Fittings.
- Q. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.
- R. UL 797 - Electrical Metallic Tubing-Steel.
- S. UL 1242 - Electrical Intermediate Metal Conduit-Steel.
- T. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit.

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. Underground:

1. Under Slab on Grade: Use rigid PVC conduit or HDPE conduit.
 2. Exterior, Direct-Buried: Use rigid PVC conduit or HDPE conduit.
 3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit, intermediate metallic conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
 4. Where rigid polyvinyl (PVC) or HDPE conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
- D. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- E. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- F. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
- G. Exposed, Exterior: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or PVC-coated galvanized steel rigid metal conduit.
- H. Corrosive Locations Above Ground: Use PVC-coated galvanized steel rigid metal conduit, aluminum rigid metal conduit, or reinforced thermosetting resin conduit (RTRC).

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. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
1. Branch Circuits: 3/4 inch (21 mm) trade size.
 2. Underground, Exterior: 1 inch (27 mm) trade size.
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 ALUMINUM RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.
- B. Fittings:
1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use aluminum.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

- B. Fittings:
 - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.06 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
- B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil (1.02 mm).
- C. PVC-Coated Fittings:
 - 1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
 - 2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
 - 3. Material: Use steel or malleable iron.
 - 4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil (1.02 mm).
- D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil (0.38 mm).

2.07 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.

2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- B. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.09 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.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

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Replacements

- D. Install aluminum rigid metal conduit (RMC) in accordance with NECA 102.
- E. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- F. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.
- G. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- H. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.
- I. 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.
- J. Connections and Terminations:
 - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 - 3. Use suitable adapters where required to transition from one type of conduit to another.
 - 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 - 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 - 6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 - 7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- K. Penetrations:
 - 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 - 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 - 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 - 4. Conceal bends for conduit risers emerging above ground.
 - 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 - 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 - 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
 - 8. Install firestopping to preserve fire resistance rating of partitions and other elements.
- L. Underground Installation:
 - 1. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 42" inches.
 - b. Under Slab on Grade: 12 inches (300 mm) to bottom of slab.
 - 2. Provide underground warning tape in accordance with Section 260553 along entire conduit length.
- M. 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.
- N. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- O. Provide grounding and bonding in accordance with Section 260526.

END OF SECTION

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SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).

1.02 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures.

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 (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
 - 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 - 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 - 3. Use suitable concrete type boxes where flush-mounted in concrete.
 - 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. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
 - 1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 - 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 - 3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

PART 3 EXECUTION

3.01 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. 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.
- E. Install boxes plumb and level.
- F. Install boxes as required to preserve insulation integrity.
- G. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- H. Close unused box openings.
- I. Provide grounding and bonding in accordance with Section 260526.

END OF SECTION

SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Warning signs and labels.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - 2. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
 - a. Service equipment.
 - b. Industrial control panels.
 - c. Motor control centers.
 - d. Elevator control panels.
 - e. Industrial machinery.
- B. Identification for Conductors and Cables:
 - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
 - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 - 1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 - 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
 - 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
 - 4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
 - 5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.
- B. Identification Labels:
 - 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
 - 1. Minimum Size: 1 inch (25 mm) by 2.5 inches (64 mm).
 - 2. Legend:
 - a. Equipment designation or other approved description.
 - 3. Text: All capitalized unless otherwise indicated.

4. Minimum Text Height:
 - a. Equipment Designation: 1/2 inch (13 mm).
5. Color:
 - a. Normal Power System: White text on black background.

2.03 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 1. Materials:
 - a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
 2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
 3. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.
- C. Warning Labels:
 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 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. Flush-Mounted Equipment: Inside of equipment door.
 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 4. Elevated Equipment: Legible from the floor or working platform.
 5. Interior Components: Legible from the point of access.
 6. Conductors and Cables: Legible from the point of access.
- 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. Secure rigid signs using stainless steel screws.

END OF SECTION

**SECTION 262726
WIRING DEVICES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Receptacles.
- B. Wall plates.

1.02 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 the placement of outlet boxes for wall switches with actual installed door swings.
 - 3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
 - 4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.03 SUBMITTALS

- A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.04 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. Unless noted otherwise, do not use combination switch/receptacle devices.

2.02 WIRING DEVICE FINISHES

- A. Provide wiring device finishes as described below unless otherwise indicated.
- B. Wiring Devices, Unless Otherwise Indicated: Gray with stainless steel wall plate, Verification during submittal process.

2.03 MANUFACTURERS:

- A. Hubbell Incorporated
- B. Leviton Manufacturing Company, Inc
- C. Pass & Seymour, a brand of Legrand North America, Inc
- D. Eaton(Arrow Hart).
- E. Engineer Pre-approved equivalent. See section 012500 - Substitution Procedures for requirements.

2.04 SOURCE LIMITATIONS

- A. Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.05 PRODUCT GRADE:

- A. Receptacles: Unless indicated otherwise, Commercial specification grade.

2.06 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. 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. Weather Resistant GFCI Receptacles: 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.

2.07 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 unless indicated otherwise by architect during submittal process.
- C. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.
- D. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130.
- B. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- C. Conductors:
1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 3. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
 4. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
- D. 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.
- E. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- F. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- G. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- H. 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.

- I. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- J. Identify wiring devices in accordance with Section 260553.
 - 1. Unless instructed differently by Architect, Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.02 FIELD QUALITY CONTROL

- A. Inspect each wiring device for damage and defects.
- B. Test each receptacle to verify operation and proper polarity.
 - 1. Line voltage: Acceptable range is 105 to 132 V.
- C. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
 - 1. Test for tripping values specified in UL 1436 and UL 943
- D. Correct wiring deficiencies and replace damaged or defective wiring devices.
- E. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete

3.03 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.04 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 262813
FUSES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fuses.

1.02 RELATED REQUIREMENTS

- A. Section 262816.16 - Enclosed Switches: Fusible switches.

1.03 REFERENCE STANDARDS

- A. NEMA FU 1 - Low Voltage Cartridge Fuses.
- B. NFPA 70 - National Electrical Code.
- C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements.
- D. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
 - 2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
 - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.
- B. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Fuses: One set(s) of three for each type and size installed.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. General Purpose Branch Circuits: Class RK1, time-delay.

2.02 FUSES

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.
- C. Provide fuses of the same type, rating, and manufacturer within the same switch.
- D. Comply with UL 248-1.
- E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.
- F. Voltage Rating: Suitable for circuit voltage.
- G. Class R Fuses: Comply with UL 248-12.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.

- B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Do not install fuses until circuits are ready to be energized.
- B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

SECTION 262816.16 ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Enclosed safety switches.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum).
- D. NFPA 70 - National Electrical Code.
- E. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations.
- F. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations.
- G. UL 98 - Enclosed and Dead-Front Switches.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within 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. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.
- B. 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.
- C. Project Record Documents: Record actual locations of enclosed switches.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. ABB
- B. Eaton Corporation
- C. Schneider Electric
- D. Siemens Industry, Inc
- E. Or Engineer approved equal

2.02 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature: Between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C).
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
 - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location.
 - 2. Minimum Ratings:
 - a. Heavy Duty Single Throw Switches Protected by Class R Fuses: 50,000 rms symmetrical amperes.
- G. Provide with switch blade contact position that is visible when the cover is open.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- J. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
- K. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- L. Heavy Duty Switches:
 - 1. Comply with NEMA KS 1.
 - 2. Conductor Terminations:
 - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 260529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 260526.

3.02 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION