PROJECT MANUAL

PROJECT NAME:

Iowa Labs Security Camera Upgrades

PROJECT ADDRESS:
2220 S. Ankeny Blvd.
Ankeny, Iowa 50023

PROJECT DATE: August 17, 2018

OWNER:
Iowa Department of Administrative Services
General Services Enterprise – Design & Construction Bureau
109 Southeast 13th Street
Des Moines, Iowa 50319

OWNER PROJECT NUMBER: 8966.00

OWNER REQUEST FOR BID NUMBER: RFB #0919335019

CONSTRUCTION MANAGER:
DCI Group
220 SE 6th St – Suite 200
Des Moines, Iowa 50309

CONSTRUCTION MANAGER PROJECT NUMBER: 17-022

ENGINEER:
Alvine Engineering
400 East Court Ave. – Suite 130
Des Moines, Iowa 50309

ARCHITECT PROJECT NUMBER: 20176525

SECTION 00 0107

SEALS PAGE

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Andy Venzke 08/17/2018

ANDREW R. VENZKE (date)
License Number 17764
My license renewal date is December 31, 2019

Pages or sheets covered by this seal:

All sections covered under Divisions 26, 27, and 28.

END OF SECTION

SECTION 00 0110

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END OF SECTION

SECTION 00 1113

NOTICE TO BIDDERS

RFB #0919335019

The Iowa Department of Administrative Services – Central Procurement Bureau, Hoover State Office Building, Level 3, 1305 East Walnut Street, Des Moines, Iowa 50319 will be receiving bids for Iowa Labs Security Camera Upgrades at Iowa Labs, Ankeny, Iowa 50023.

The Iowa Department of Administrative Services anticipates construction to begin on November 13, 2018 and end on March 1, 2019.

Bids must be received no later than **2:00 pm, local time, Thursday, September 13, 2018**. Late bids will not be considered. Bids are to be delivered to the Office of the Department of Administrative Services – Central Procurement Bureau, Hoover State Office Building, Level 3, 1305 East Walnut Street, Des Moines, Iowa, 50319. Bids under $135,000.00 may also be delivered via e-mail to Steve Oberbroeckling at steve.oberbroeckling@iowa.gov. Bids shall be submitted on the Bid Form and 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. Scanned and emailed bids must be legible. For emailed bids, the bidder must include a scanned image of a bid bond prepared by a bonding company licensed to transact business in the State of Iowa. 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. If providing bid security in forms other than a bid bond, then the bid must be hand delivered and not emailed.

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.

An **optional** Pre-Bid meeting will be held on Tuesday, September 4, 2018 at 1 pm at Iowa Labs at 2220 S. Ankeny Blvd, Ankeny, Iowa 50023. This meeting is not mandatory but is highly recommended.

Bidding Documents may be obtained from Action Reprographics by visiting www.actionrepro.com or by calling (515) 288-2146 on or after Monday, August 27 , 2018.

For further information regarding this project contact:
Steve Oberbroeckling – Issuing Officer
Iowa Department of Administrative Services – Central Procurement Bureau
1305 East Walnut Street
Des Moines, Iowa 50319
Phone: (515) 725-2090
E-Mail: steve.oberbroeckling@iowa.gov

END OF SECTION

SECTION 00 2113

INSTRUCTIONS TO BIDDERS

RFB #0919335019

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: Install new and replace existing exterior and interior security cameras at the Iowa Labs facility along with upgraded software and equipment.

1.03 OWNER

A. State of Iowa, Department of Administrative Services, Hoover State Office Building, Level 3, 1305 East Walnut Street, Des Moines, IA 50319

1.04 STATE AGENCY REPRESENTATIVES AND CONTACTS

A. PURCHASING AGENT: Steve Oberbroeckling – Issuing Officer**,** State of Iowa, Department of Administrative Services**,** Central Procurement Bureau**,** Hoover State Office Building, 3rd floor**,** 1305 East Walnut Street**,** Des Moines, IA 50319-0105, Phone: 515-725-2090; email: steve.oberbroeckling@iowa.gov

B. OWNER REPRESENTATIVE: Jennifer Kleene**,** State of Iowa, Department of Administrative Services State Design and Construction Resources Bureau, 109 SE 13th Street, Des Moines, IA 50319, Phone: 515-725-0454; email: jennifer.kleene@iowa.gov

C. ON-SITE COORDINATOR: Bill Messinger, State of Iowa, Department of Administrative Services, 109 SE 13th Street, Des Moines, IA 50319, Phone: 515-281-3137; email: bill.messinger@iowa.gov

D. CONSTRUCTION MANAGER CONTACT: Michael Steen, DCI Group Inc., 220 SE 6th St., Suite 200, Des Moines, IA 50309, Phone: 515-975-8348; email: MichaelS@dcigroup-us.com

E. DESIGN PROFESSIONAL CONTACT: Andrew Venzke, Alvine Engineering**,** 400 East Court Ave., Suite 130, Des Moines, Iowa 50306**,** Phone: 515-243-0569; email: avenzke@alvine.com

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 PROPOSAL FORM AND SUBMISSION

A. A properly prepared and submitted bid document is the bidder's responsibility. Bids are to be made in accordance with these Instructions to Bidders and items included on the Bid Form. Failure to comply may be cause for rejection.

B. The Bid is to consist of the "Bid Form" (required) or exact copy of the form, together with the other documents 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 documents (properly completed) and submitted in properly labeled envelopes:
    a. A ***SEALED BID*** envelope (a regular envelope furnished by the Bidder) identified with the name and address of the company submitting the bid, the project name, the bid package name and/or number, sealed bid number, due date and time for bids' receipt, and clearly labeled ***SEALED BID*** containing:
        1) Bid Form (blank form included in Project Manual) (Required)
        2) Non-discrimination Clause form (blank form included in Project Manual)
        3) Targeted Small Business Pre-bid Contact form (blank form included in Project Manual)
        4) Bid Security (documentation provided by Bidder) (Is to be submitted in a separate envelope) (Required)
2. **BIDS LESS THAN $135,000.00 MAY BE EMAILED TO** steve.oberbroeckling@iowa.gov **ALONG WITH ALL REQUIRED BID DOCUMENTS. SCANNED AND EMAILED BIDS MUST BE LEGIBLE. SCANNED IMAGES OF CHECKS FOR BID SECURITY WILL NOT BE ACCEPTED FOR EMAILED BIDS. FOR EMAILED BIDS, THE BIDDER MUST INCLUDE A SCANNED IMAGE OF A BID BOND PREPARED BY A BONDING COMPANY LICENSED TO TRANSACT BUSINESS IN THE STATE OF IOWA. BIDS OVER $135,000.00 WILL BE CONSIDERED FORMAL BIDS AND MUST BE DELIVERED IN HARD COPY TO THE PURCHASING OFFICER LISTED ABOVE BEFORE THE BID DEADLINE.**

C. All blank spaces on each document are to be completed, in ink or typewritten, unless the blank has otherwise been noted by Owner as "Not Applicable to this Project." Erasures or corrections shall be initialed by the person signing the bid. Where requested, amounts shall be stated in both words and figures. If words and figures do not agree, the amount written in words shall be considered correct.

D. Include the amount for performing all work described in the drawings and specifications for Base Bid and for each Alternate Bid requested.

E. Acknowledge receipt of all Addenda issued, where so indicated on the Bid Form.

F. The Bid Form and other required documents are to be signed, where so indicated, by an officer of the company having authority to bind the company in a contract. The name of the person signing the bid and his/her title shall be typed or printed below the signature.

G. Commencement of the work of the contract shall begin with the Contractor's receipt of a fully executed contract (signed by both parties).

H. 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.

I. The company's Federal I.D. Number and the Iowa Contractors Registration Number shall be included in the Bid Form.

J. 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. All requested Alternate Bids are to be bid. Failure to do so may result in disqualification of your bid. 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.

K. 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 Bidding Documents 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 Bidding Documents' original scope of work for the respective Base Bid or Alternate Bid.

L. A Completed State of Iowa Nondiscrimination Clause form and Subcontractor Targeted Small Business Enterprise Pre-Bid Contact Information form, included in these Bidding Documents, are to accompany the Bid. 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.

M. The completed Bid Form, and above referenced documents, are to be placed in the Sealed Bid envelope included with these Bidding Documents. 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 enclosed in the Sealed Bid envelope containing the Bid Form, Bid Security and other documents.

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**

A. All drawing sheets bearing the project name: Iowa Labs Security Camera Upgrades, Dated 08/17/2018

3.05 **BID SECURITY**

A. Each Bid shall be accompanied by Bid Security in a separate sealed envelope.
B. The Bid Security shall be in the form of a Certified check, Cashier's check or a Bid Bond 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. For emailed bids, a scanned copy of a Bid Bond may be submitted with the Bid. If a Bid Bond is not used, Certified checks or Cashier's checks must be hand delivered or mailed in a sealed envelope even if the Bid is emailed. 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 within ten days of execution of the Contract for construction of this Project, but not later than the start of construction in any event. 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 received at the place, and not later than the time, specified below for receipt of Bids, or any extension thereof made by Addendum issued subsequent to issuing the Bidding Documents. Oral or telephonic Bids are invalid, and will not receive consideration. The Bidder shall assume full responsibility for the timely delivery and receipt of the Bid by the Procurement Division of the Department of Administrative Services at the location herein specified. Late bids will not be accepted, and will be returned unopened to the Bidder.
B. Sealed Bids will be received at the time and location as follows:
   1. On or before 2:00 PM Central Time, September 13, 2018
      State of Iowa, Department of Administrative Services
      Central Procurement Bureau
      Hoover State Office Building, Level 3
      1305 East Walnut Street
      Des Moines, Iowa 50319-0105
      Attention: Steve Oberbroeckling – Issuing Officer
      Or by email: steve.oberbroeckling@iowa.gov

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. An **optional** Pre-Bid meeting will be held on Tuesday, September 4, 2018 at 1:00 pm at Iowa Labs at 2220 S. Ankeny Blvd., Ankeny, Iowa 50023. This meeting is not mandatory but is highly recommended.

3.010 **QUESTIONS**

A. Questions on this project may be raised and discussed at the time of the Pre-Bid Meeting. Questions should be submitted, in writing, by 2:00 pm, September 7, 2018, to the Purchasing Agent previously indicated in these Instructions to Bidders.

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 by 2:00 pm, September 7, 2018. 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 on the Bidder's proposal, in the location so indicated on the Bid Form. 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, and include a statement such as "or equal", "equal to", "equivalent to", or "basis of design", a substitute product will be considered when written request is received by 2:00 pm, September 7, 2018.

B. 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.

C. **Subsequently, substitutions 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).**

D. 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.

E. 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 affect 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.

F. 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.

3.013 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 formal sealed bid must be made in writing and delivered to the previously designated Purchasing Agent for the Department of Administrative Services in a sealed envelope, properly identifying the bid that is to be modified. 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 Base 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 CLOSING**

A. Bids received prior to the time of opening will be securely kept, unopened. The Purchasing Agent for the Department of Administrative Services designated to receive Bids will determine when the specified time has arrived. No bid received thereafter will be considered.

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 Form; 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 thirty (30) 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 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.2l 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 Form, 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.

3.029 **PROJECT MANUAL/ DRAWINGS**

A. This Project Manual is intended to supplement the Project Drawings prepared by Alvine Engineering dated August 17, 2018.

END OF SECTION

SAMPLE

ACORD

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	CONTACT NAME: Agent's Information
Agent's Name Agent's Address	PHONE (A/C, No, Ext): / FAX (A/C, No):
	E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Company A (AM Best Rated A/VI or Better)	Admitted Carriers
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
Trade Contractor's Name
Trade Contractor's Mailing Address

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

amount varies based on paragraph 10.2.2 of the ConsensusDocs 802 contract

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.

CERTIFICATE HOLDER

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

CANCELLATION

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

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 Manger 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 – 09/17/2018
B. Anticipated Date of Commencement – 11/13/2018
C. Substantial Completion by – 03/01/2019

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

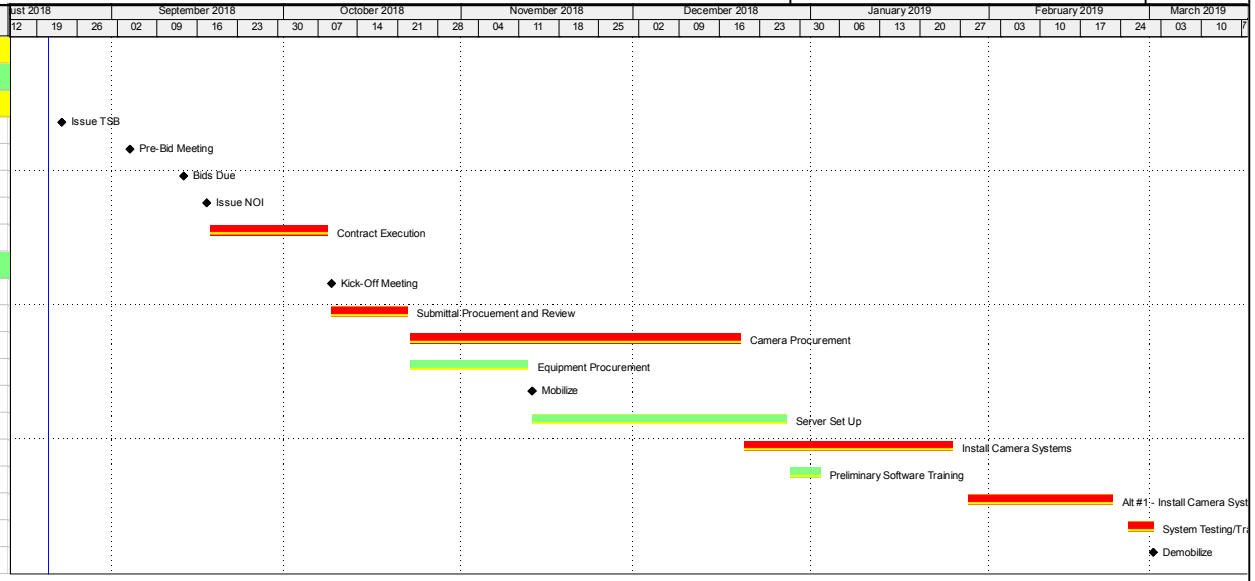
END OF SECTION

DCI GROUP
DESIGN + CONSTRUCTION INTEGRATION

IA Labs Security Camera Upgrades
Preliminary Construction Schedule

23-Aug-18

Activity ID	Activity Name	Original Duration	Remaining Duration	Free Float	Start	Finish
IA Labs Security Camera Upgrades						
Pre-Construction						
Bidding						
A1000	Issue TSB	0	0	0	23-Aug-18*	
A1010	Pre-Bid Meeting	0	0	0	04-Sep-18	
A1020	Bids Due	0	0	0		13-Sep-18
A1030	Issue NOI	0	0	0		17-Sep-18
A1040	Contract Execution	15	15	0	18-Sep-18	08-Oct-18
Construction						
A1050	Kick-Off Meeting	0	0	0	09-Oct-18	
A1060	Submittal Procuement and Review	10	10	0	09-Oct-18	22-Oct-18
A1070	Camera Procurement	40	40	0	23-Oct-18	19-Dec-18
A1140	Equipment Procurement	15	15	0	23-Oct-18	12-Nov-18
A1080	Mobilize	0	0	25	13-Nov-18	
A1130	Server Set Up	30	30	0	13-Nov-18	27-Dec-18
A1090	Install Camera Systems	25	25	0	20-Dec-18	25-Jan-19
A1115	Preliminary Software Training	3	3	42	28-Dec-18	02-Jan-19
A1095	Alt #1 - Install Camera Systems	20	20	0	28-Jan-19	22-Feb-19
A1110	System Testing/Training	5	5	0	25-Feb-19	01-Mar-19
A1120	Demobilize	0	0	0		01-Mar-19



Primary Baseline
Actual Work
Remaining Work
Cri...
Mil...

Data Date: 21-Aug-18
Baseline:

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. Electrical Permit and Inspections: Trade Contractor is responsible for permits and inspections.
B. 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

RFB #0919335019

BID FORM for CONSTRUCTION CONTRACT
for
Iowa Laboratories Facility
2220 S. Ankeny Blvd, Ankeny, Iowa
Project 8966.00

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

The following documents are to be completed and submitted with your bid.

1. Bid Proposal Form (Required)
2. Non Discrimination Clause Form
3. Contractor Targeted Small Business Enterprise Pre-Bid Contract Information Form
4. Bid Security – 5% of total Bid amount (Is to be submit in separate envelope) (Required)

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 August 17, 2018, 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 – Security Cameras

Description: Provide and install new and replacement cameras along with necessary equipment to provide a complete and functional system and also connect existing cameras to upgraded system.

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

_____

_____Dollars

($_____).

ALTERNATES:

ALT 01 – Additional Security Cameras

Description: Provide and install new and replacement cameras along with necessary equipment to provide a complete and functional system per Alternate drawings.

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

_____

_____Dollars

($_____).

UNIT PRICES:

UNIT 01

Description: ADD/DEDUCT: Axis Q3517-LVE or Approved Equal – complete system

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

_____Dollars

($_____) per each.

UNIT 02

Description: ADD/DEDUCT: Axis M3037 or Approved Equal – complete system

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

_____Dollars

($_____) per each.

UNIT 03

Description: ADD/DEDUCT: Axis P3374-LV or Approved Equal – complete system

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

_____Dollars

($_____) per each.

UNIT 04

Description: ADD/DEDUCT: Axis P3375-LVE or Approved Equal – complete system

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

_____Dollars

($_____) per each.

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 FORM

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, the undersigned, 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.

1.02 SIGNATURE

A. _____
Signature of Appropriate Official

_____
Title

_____
Date

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 00 4116.02

TARGETED SMALL BUSINESS FORM

PART 1 - GENERAL

1.01 TARGETED SMALL BUSINESS FORM

A. A Subcontractor Targeted Small Business Enterprise Pre-Bid Contact Information form, included in this section, is to accompany the Bid. 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.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

IOWA DEPARTMENT OF ADMINISTRATIVE SERVICES
SUBCONTRACTOR
TARGETED SMALL BUSINESS ENTERPRISE
PRE-BID CONTRACT INFORMATION

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

SUBCONTRACTOR	TSB	DATES CONTACTED	QUOTES RECEIVED		QUOTATION USED IN BID	
			YES/NO	DATES	YES/NO	DOLLAR AMOUNT PROPOSED TO BE SUBCONTRACTED

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 Obligee 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 Obligee shall accept the bid of the Constructor, the Constructor shall enter into an Agreement with the Obligee 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 Obligee the difference between the amount of Constructor's bid and the amount of such agreement the Obligee 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 4393

BID SUBMITTAL CHECKLIST

PART 1 - GENERAL

1.01 BID SUBMITTAL CHECKLIST

A. The Bid Form shall be completed in full and signed by an officer of the bidder with authority to bind in a contract.
B. The Bid shall be submitted in a sealed envelope and shall be clearly identified on the outside by the Sealed Bid Number, Due Date, Time and Project Description.
C. The Bidder is responsible to see that the bid is received in the State of Iowa, Department of Administrative Services, Central Procurement Bureau, Hoover State Office Building, Level 3, Des Moines, Iowa 50319-0105, on or before the due date and time specified. Late bids shall not be accepted. Late bids shall be returned unopened to the bidder.
D. If a Bid Bond is called for, it shall accompany the Bid Form in a separate sealed envelope. Otherwise the bid will be ruled non-compliant with the specifications.
E. If a Non-discrimination Clause form is called for, it shall accompany the Bid Form.
F. If a Targeted Small Business Pre-bid Contact form is called for, it shall accompany the Bid Form.
G. If a Certificate of Site Visit form is called for, it shall accompany the Bid Form.
H. In all cases, no verbal communications by any party will override written communications from the issuing office.
I. Bids cannot be changed after the bid opening. Changes prior to bid opening shall be in writing.
J. 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.
K. 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.
L. A properly prepared and submitted bid document is the bidder's responsibility.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

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

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 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 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 constructionmeans, 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 Contactor'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 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 Contract 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 [X] 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. f 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 be 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 propertyinsurance,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.)

[X] 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 Obligee 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 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 Obligee 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)

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: Iowa Laboratories Facility, 2220 S. Ankeny Blvd., Ankeny, Iowa 50023
B. DAS Project #: 8966.00
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: Michael Steen, DCI Group, 220 SE 6th Street – Suite 200, Des Moines, Iowa 50309

1.03 PROJECT SUMMARY

A. The project includes installation of new and replacement of existing exterior and interior security cameras along with removal of existing cameras. Project also consists of connecting existing cameras to upgraded security system.
B. Target date to provide substantial completion is March 1, 2019.

1.04 BID SCOPE SUMMARY

A. Scope Applicable to All Bid Packages:
   1. See Section 01 1201 – General Work Requirements
   2. See Section 01 1202 – Special Work Requirements

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. Work in secured areas will be coordinated with DCI Group and Iowa Labs.
   2. All work that requires disruption of facility utilities or equipment will be coordinated with DCI Group and Iowa Labs.

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 upon Substantial Completion.
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. Never leave keys in any vehicle.
L. 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.
M. During an emergency, follow the instructions of the security staff.

1.09 BID PACKAGE INSTRUCTIONS

A. **Bid Package #01** – Security Cameras: Trade Contractor shall include all of the following, but not limited to, as part of the contract:
   1. Includes specification:
      a. Division 00 – Procurement and Contract Requirements
      b. Division 01 – General Requirements
      c. Division 26 – Electrical
      d. Division 27 – Communications
      e. Division 28 – Electronic Safety and Security
   2. Security Camera System
      a. This contractor is responsible for the complete installation of the security camera system, including but not limited to, demolition, new cameras, new software, pathways, head end equipment, licensing, commissioning and training.
      b. Contractor is responsible to patch finishes to match existing after removal of existing cameras and equipment or where new equipment leaves inconsistent finishes exposed.
      c. Contractor is responsible to patch and finish any drywall or other finishes damaged due to installation of new equipment or conduit.
      d. Contractor shall coordinate with Construction Manager to ensure all privacy protections are in place prior to starting work in each area.

e. Contractor is responsible to coordinate with Construction Manager for scheduling necessary security escorts.
f. Contractor shall coordinate laydown area with Construction Manager. It is anticipated that Contractor will have (4) parking stalls available for staging.
g. Contractor shall not disrupt existing security system until new system is operational and tested.
h. Contractor is responsible for all new conduit and pathways to connect new cameras to security system.
i. Upon execution of contract, Contractor shall provide a schedule of values breaking out all cost associated with the following cameras: LLA.3, LLA.4, 1.A.1.

B. **Alternate #01** – Additional Security Cameras: Trade Contractor shall include all of the following, but not limited to, as part of the contract:
1. Contractor is responsible for removal of existing cameras and installing new or replacement cameras as shown in the contract documents.
2. Contractor shall revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
3. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
4. Execute accepted alternates under the same conditions as other work of the Contract.

C. **Unit Price #01** – Axis Q3517-LVE: Trade Contractor shall include all of the following, but not limited to, as part of the contract:
1. Unit price shall include providing and installing the camera, camera license, camera mount, 200 feet of Category 6 cabling, Category 6 cabling terminations and testing, and any other appurtenances required to create a complete and functional security camera.
2. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.
3. Owner reserves the right to reject Contractor's measurements of work in place that involves use of established unit prices and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

D. **Unit Price #02** – Axis M3037: Trade Contractor shall include all of the following, but not limited to, as part of the contract:
1. Unit price shall include providing and installing the camera, camera license, camera mount, 200 feet of Category 6 cabling, Category 6 cabling terminations and testing, and any other appurtenances required to create a complete and functional security camera.
2. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.
3. Owner reserves the right to reject Contractor's measurements of work in place that involves use of established unit prices and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

E. **Unit Price #03** – Axis P3374-LV: Trade Contractor shall include all of the following, but not limited to, as part of the contract:
1. Unit price shall include providing and installing the camera, camera license, camera mount, 200 feet of Category 6 cabling, Category 6 cabling terminations and testing, and any other appurtenances required to create a complete and functional security camera.
2. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.
3. Owner reserves the right to reject Contractor's measurements of work in place that involves use of established unit prices and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

F. **Unit Price #04** – Axis P3375-LVE: Trade Contractor shall include all of the following, but not limited to, as part of the contract:
   1. Unit price shall include providing and installing the camera, camera license, camera mount, 200 feet of Category 6 cabling, Category 6 cabling terminations and testing, and any other appurtenances required to create a complete and functional security camera.
   2. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.
   3. Owner reserves the right to reject Contractor's measurements of work in place that involves use of established unit prices and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01 1201

GENERAL WORK REQUIREMENTS

1.01 BIDDING

A. Trade Contractor shall include all applicable fees, permits, freight, hoisting, scaffolding, clean up, supervision, overhead, etc. to perform his work.
B. The owner will provide the general building permit only. All other permits required for completion of contractor's scope of work or by any governing body are the responsibility of said contractor.
C. Bidders to review ALL Bid Packages to fully understand the requirements of each package. Where two bid packages conflict, confirm with Construction Manager as to which package is to perform the work noted before bidding. After bidding, any conflict noted will be evaluated by the Construction Manager. The Construction Manager will then determine which package should perform the work and which package will credit the associated work's cost.
D. Where conditions conflict in the project manual or project drawings with Construction Manager's general work requirements, special work requirements, or bid package conditions, contact the Construction Manager for clarification. When in doubt figure the more extensive requirement.
E. Each contractor is responsible for the identification of alternates and how they relate to each bid package. If a bid package is affected in ANY way by ANY of the alternates, an add/deduct should be noted on the bid form. If there is no change in cost write zero dollars.
F. The Contractor should visit the site of the Work to acquaint the firm with all local conditions affecting the Contract, including the structure of the ground, the obstacles which may be encountered, and all other conditions relative to the Work to be performed; and shall not be allowed any extra compensation by reason of any difficulties or obstacles which the Bidder could have discovered or reasonably anticipated prior to Bidding. Contractor shall review Instructions to Bidders for coordination of site visits.
G. On all project Drawings, figures take precedence over measurement by scale, and any scaling is done at the Contractor's own risk. The Design Professional shall decide on questions that may arise regarding the meaning and intent of the Project Drawings and Project Specifications. Should any details or figures have been omitted which are necessary to a clear understanding of the Work or should any error appear in either, or should discrepancies be found between the Project Drawings and Project Specifications, it shall be the duty of the Contractor to notify the Construction Manager of such omissions, errors, or discrepancies, and in no case proceed in uncertainty. Mistakes resulting from the Contractor's neglect to notify the Construction Manager in such matters shall be corrected at the expense of the Contractor. Bidders are responsible for all electronic documents and their use is at their risk.
H. Construction Manager (DCI Group) has been engaged for this Project to serve as an advisor to the Owner and to provide assistance in administering the Contract for Construction between Owner and the Contractor. The Construction Manager will not be providing any self-performed work for this Project.
I. All Contractors are responsible for on the job supervision of their work, or any subcontracted work. An onsite Superintendent or lead foreman is required during any time that work is being performed to coordinate their work and work with other trades. No superintendent or lead foreman may be replaced without approval of the Owner and DCI Group. Any work necessary to be performed after the regular working hours shall be supervised and shall be done at no additional cost to the Owner.
J. All food and drinks shall be confined to CM designated areas and a maintained covered trash container shall be provided by the contractor. Failure to comply with this rule may cause a need for extra cleaning efforts by others which will result in a back charge to the Contractor.
K. Tools, materials, and equipment storage and security is the responsibility of each Contractor.
L. All work shall comply with the applicable codes and standards adopted by the Authority having Jurisdiction.

M. All Authorities having Jurisdiction inspections shall be requested by the responsible contractor and coordinated through the Construction Manager. Attendance by contractors is mandatory as applicable to the work being inspected.
N. All contractors must have the appropriate licenses to perform work in the jurisdictions.
O. Before ordering any materials or performing any Work, the Contractors shall verify all measurements at the Project Site for the particular Work and be responsible for the correctness of same. No extra charge or compensation will be allowed to the Contractor on account of differences between actual dimensions and the measurements shown on the Project Drawings. Any noticeable discrepancy in this request shall be reported to the Construction Manager immediately for his consideration and decision. All the component parts of the Work shall be carefully checked and laid out in order that the structure as a whole shall conform to the intent of the Project Drawings and Project Manual.
P. The Contractor shall have personnel attending regular project meetings. These meetings will be held at intervals established by the Construction Manager. Contractor must have representative attending when they are on the job or needed for coordination prior to having work start on the project. The representative attending must be able to adequately represent the Contractor and speak on the Contractors behalf providing valuable information to the meeting; specifically, things such as schedule, cost, production, manpower, etc.
Q. Contractor will be required to attend all pre-installation conferences before commencement of related work.
R. Trade Contractor shall complete a daily log for each work day on site and submit to Construction Manager. Content of daily log will be directed by Construction Manager.

1.02 SAFETY

A. The contractor shall comply with all local and federal, safety and health requirements.
    1. Contractor will provide a safety plan customized for the project to DCI Group.
    2. It is the contractor's responsibility to notify other contractor's on the jobsite of any hazardous materials to which their employees may be exposed.
    3. All Contractors shall inform their employees to immediately advise their supervisor of any unsafe conditions that are encountered. The supervisor shall promptly remediate such danger and/or contact the Construction Manager.
    4. Contractors performing hot work are to have a fire extinguisher in their work areas at all times as applicable.
    5. All Contractors are responsible for their own fall protection.
    6. Contractors are required to provide emergency phone numbers upon the request of the Construction Manager. Emergency phone numbers are numbers where the Contractor can be reached during off hours.
    7. All floor edge, roof and similar openings, barricades, handrails, or cabling for fall protection will be installed by the Contractor that creates the hazard as part of that Contractor's scope of work. At no time shall an opening be left unprotected from fall hazard. All Contractors shall protect and maintain such devices per OSHA standards. When a device conflicts with the work of this bid package or when the work of this bid package replaces the need for such devices, this Contractor is responsible for removal. If the work of this Contractor requires additional holes/penetrations, this Contractor shall provide necessary protection until final materials are installed.
    8. No fire exit can be blocked at any time.

1.03 SITE MANAGEMENT

A. All contractors are responsible for all their own utility locates. This shall include both public and private locates. All Contractors shall coordinate locates with One Call Services.
B. When active services are encountered in the Work, protect, brace and support existing active sewers, gas, electric or other services, where required for proper execution of the Work. If existing active services are encountered that require relocation, make request in writing for

determination. Do not proceed with Work until written directions are received. Do not prevent or disturb operation of active services that are to remain.

C. All contractors are required to protect their work. Provide proper protection for all existing work performed by others when performing your work next to, or around, other materials. Repair or replacement of any damaged material will be the responsibility of the contractor who damaged it.
D. All contractors/vendors are responsible for their own cutting and patching unless otherwise specified.
E. All contractors are responsible for maintaining dust control during their work.
F. Contractors shall be responsible for maintaining traffic control coordination with the Owner, DCI Group, and the Authority Having Jurisdiction.
G. Public and private roadways will be maintained and cleaned as required by the contractor leaving debris, mud, excess gravel, etc. on roadways at their expense as defined in bid packages.
H. No steel track mounted equipment will be allowed on finished paved surfaces. Any damage to the finished paved surfaces will be repaired at the cost to the contractor causing such damage.
I. Bridging of finished pavement will be responsibility of the contractor. This includes bridging curbs, pavement, sidewalks, etc. Any damage to the aforementioned including pavement markings will be repaired or replaced at the cost of the contractor causing such damage.
J. Contractors that have work that requires equipment off of the existing road ways are required to locate and protect from damage all under and above ground existing features such as utilities, tunnels, landscaping, etc… The Contractor will be responsible to repair back to original condition any damages that occur, including but not limited to ruts and sod damage.
K. Any areas disturbed or damaged by one's operation are to be repaired to Owner/Construction Manager's satisfaction.
L. Contractor shall clean their installed materials prior to the next successor activity.
M. Any signs located on the jobsite must be approved by the Construction Manager. Signage will not be allowed in most cases unless it is required for safety or provides instruction.
N. Receiving, unloading and handling of material provided by the bid package shall be included. Spotting location shall be coordinated with the Construction Manager. All deliveries shall be coordinated with other Contractors and Construction Manager in advance of the delivery. Provide freight to the jobsite for any material provided. If storage is not available onsite, each bid package shall include other means of secure storage. If contractor is not onsite to unload delivery, the delivery will be rejected and will have to be re-scheduled at the contractor's expense. Materials must be stored off the ground, out of the mud and on a solid surface. As required or needed, material should be stored on dunnage or pallets in order to keep it off the ground or surface below. Special storage is the responsibility of respective contractor.
O. Contractor shall not store materials within construction designated locations without approval from Construction Manager. No materials storage will be allowed that may inhibit construction progress.
P. The Contractors shall layout and correctly establish all lines, levels, grades, positions, walls, partitions, equipment and location of all Work on the Project and be responsible for their accuracy and proper correlation with control lines, monuments and data furnished. Such monuments and data shall be carefully preserved and, if displaced, reset at the expense of the persons displacing them.
Q. All Contractors are responsible for the coordination of their work with the complete set of specifications, construction drawings, addenda, request for information (RFI's), Architect's Instruction to Contractor (ITC), shop drawings, coordination drawings, and other contract modifications.
R. Contractor shall carefully inspect any work performed by others that is to receive, align, abut or similarly relate to the Contractor's work and shall immediately notify the Construction Manager in writing of any apparent defects or inconsistencies. The Contractor is responsible for coordinating and verifying the dimension, measurements, and elevations at the project site relevant to the Contractor's work. If Contractor commences his work without such written notice, such commencement shall constitute acceptance of all such work performed by others and of all such field conditions, and all costs incurred in connection with the Contractor's work as a result thereof shall be borne by Contractor.

S. Incorporate construction tolerances for the work of others into the design of the systems in this scope of work. Include field measurements of work by others and any necessary adjustments to systems prior to fabrication to accommodate such allowable tolerances, or accept all costs to correct materials, which do not fit job conditions.
T. Any interior work that is scheduled to be completed while Owner is in normal operation must be sensitive to the Owners continued use of the building. No workers are allowed to be in areas of the building that are not directly related to scope of work. Hallways and general access paths to construction areas must also be kept clean at all times. The Owner has the right at any time to shut down any construction activities that they deem to be too much of a distraction to the occupants of the building.
U. All contractors are responsible for familiarizing themselves with the coordination and sequencing requirements related to Owner furnished equipment.
V. If not already required by the contract documents and reasonably requested by the Construction Manager, the Contractor shall prepare coordinated drawings in areas of congestion specifically noting and advising the Construction Manager of potential conflicts between the Contractor's work and other work at the project. Even with such cooperative and coordinated efforts should a conflict occur the Construction Manager will determine how such conflicts should be resolved and its decision in that regard will be final. The Contractor agrees to abide by such decisions and make any changes required to eliminate such conflict without additional costs or expense to the Owner.

1.04 SCHEDULE MANAGEMENT

A. Prior to the commencement of the construction for the Prime Contract Work, the Prime Contractor shall participate in a minimum of two (2) joint planning meetings with the Construction Manager and other Prime Contractors for the purpose of planning the overall Construction Schedule. A Preliminary Construction Schedule as developed by the Construction Manager will be used as the basis of the overall Construction Schedule. In consultation with the Prime Contractor, the Construction Manager shall incorporate the Prime Contract Work and work of other prime contractors into the overall Construction Schedule for the entire project. Critical Milestones and working hours as defined by the Construction Manager (as included in the bidding documents) will not be altered. The Prime Contractor shall on a weekly basis (at a minimum) provide the Construction Manager scheduling information with regards to progress and work to be performed in the next 4 (four) weeks. The Prime Contractor shall be bound by the Construction schedule. Nothing in the Prime Contract Agreement shall relieve the Prime Contractor of any liability for any unexcused failure to comply with the agreed upon overall Construction Schedule or any completion dates. The Construction Manager shall have the right to coordinate the Prime Contractors, including the right, if necessary, to change the time, order and priority in which the various portions of the Prime Contract Work and other work associated with the Project shall be performed.
B. All Contractors shall cooperate with the Construction Manager and with other Contractors. The completion of the Work will depend upon a collective effort by all parties involved.

1.05 GENERAL HOUSEKEEPING

A. Daily cleanup (broom clean) of dust and debris from construction operation is part of each contractor’s scope of work. If any contractor fails to keep the site clean and organized on a continuous basis, the Construction Manager will notify the contractor in writing only once. The contractor will then have 24 hours to correct the situation. If the contractor fails to correct the situation, the Construction Manager will hire another party for cleaning and charge the said contractor. Trade Contractor shall submit prior to beginning work a plan to the Construction Manager defining manpower and methods for achieving daily cleanup. If Construction Manager deems necessary, each Trade Contractor shall provide 1 employee for each 5 employees on the project to clean all work areas and/or staging areas to a broom clean condition. If the Trade Contractor has less than 5 employees on site, the contractor will provide 1 employee to the

necessary cleanup requirement. Cleanup duration will take as long as it takes to achieve the broom clean results.

END OF SECTION 01 1201

SECTION 01 1202

SPECIAL WORK REQUIREMENTS

1.01 GENERAL

A. Bidders are to hold their bids for a period of sixty (30) days after the bid.
B. Contractors and their employees shall show upmost respect for the occupying students and staff. Profanity and unnecessary loud language will not be tolerated.
C. Each Contractor working in Owner occupied space will provide necessary means of protection to floors, walls, ceilings, equipment as required to accomplish work without harming or damaging existing conditions. All damage performed during this work will be charged to the responsible contractor.
D. All contractors working on site shall be required to pass State of Iowa background checks.
E. The use of motorized scissor lifts will not be allowed except under special circumstances and must have prior approval from the Construction Manager.
F. All deliveries must be accepted by the Contractor.
G. Owner will provide snow removal to all existing pavements on campus that are not under construction. See specific Contractor's responsibility under specific Bid Packages.
H. Contractor includes complete cleanup and haul off to dumpster (Provided by Bid Package #1) for all typical construction debris resulting from this scope of work. Bid Package #1 Contractor will be responsible for providing dumpsters as required for the entire project duration and understands that ALL Bid Packages will be using dumpster. Each Prime Contractor to provide brooms, shovels and other equipment for cleanup for their respective scope of work. Excess materials shall be removed from the site at the Contractor's expense. All primes shall remove debris on a daily basis.
I. Contractor will be responsible to provide portable generators or an alternative power source for all tools and equipment that require a power source higher than 120 Volt.
J. Contractors working on roofs are required to take appropriate precautionary measures to protect existing roofing from damage. Contractors are required to take all precautionary measures necessary to ensure that their items do not fall or blow off the roofs.
K. Prior to performing work in areas with smoke and fire detection systems the Contractor shall coordinate with the CM precautionary measures to eliminate false alarms. If the fire alarm system is activated and there is not an emergency the Contractor responsible for the false activation shall be responsible to pay for all resulting owner incurred expenses such as Emergency Response fees.
L. The Iowa Laboratories Facility has made their restrooms available for Contractor use during construction. Contractors shall coordinate with CM for specific restrooms available to Contractors. Contractors shall keep restrooms orderly and clean. Abuse of restrooms will result in Contractors providing temporary toilet facilities at the Contractors' expense.
M. Contractors shall document existing conditions prior to start of work. All damage to existing pavements, landscaped areas, and all other existing property will be repaired by the responsible Contractor. Interior as well.
N. The Prime Contractor's shall provide the Construction Manager detailed information as outlined below for the purpose of developing the Construction Schedule:

a. SUBMITTALS:

i. Submittal Schedule: Prime Contractor shall submit a submittal schedule listing all required submittals, submittal "To CM" dates, procurement durations, and expected dates for materials to be on the jobsite. The submittal schedule shall be submitted to the CM within five (5) business days of receipt of Owner/Prime Contractor Agreement.
ii. Format: Submittal Schedule shall be prepared in an Excel spreadsheet.
iii. Materials & Long Lead Procurement: Prime Contractor shall identify any/all submittal items that require "field verifies" and also identify the dates when these field verifies can be taken.

O. See preliminary construction schedule in Section 00 3113. This schedule will aid the bidder(s) in understanding the preliminary scheduling and planning for the project. As the construction schedule is finalized the **Prime Contractor and their Subcontractors** shall participate in a meeting with the Construction Manager and other Prime Contractors for the purpose of presenting the overall Construction Schedule. These "Subcontractors" shall be any/all subcontractors who will be performing Work on the project.

P. Per the preliminary construction schedule the bidder(s) acknowledges that there are multiple mobilizations, phases, sub-phases, material deliveries, and milestone completion dates required in order to complete the work.

Q. The Owner owns the weather duration contingency as shown in the preliminary construction schedule on the following pages. The Construction Manager manages and will adjust the weather duration contingency. As weather days are not utilized the milestone dates shall be adjusted accordingly.

R. Expected work hours will be 7:00 AM to 5:00 PM Monday thru Friday (5 day work week). Contractors requiring working time other than these hours are to coordinate and receive approval in advance from the Construction Manager. The Contractor shall provide at his expense increased work crews and/or overtime necessary to meet the scheduled milestones. Contractor shall immediately notify the Construction Manager of any delays in the work. Special shift requirements and exceptions are as follows:

S. The forecasted date to start construction is November 13, 2018.

T. After contract award bid the Contractor is required to attend a meeting with the Construction Manager to review bid package scopes.

U. Parking and material staging on site will be limited. All contractors shall coordinate one's parking and material staging with the DCI Group Project Manager, DCI Superintendent or DCI Designated Personnel.

V. The jobsite is on Public Property. Smoking or smokeless tobacco **WILL NOT** be allowed. Also, no shelled sunflower seeds are allowed inside the enclosed facility.

W. No radios or headsets are allowed in the construction areas.

X. All warranties start at Project Substantial Completion, Contractor will be required to provide from this date and not the startup date of the equipment. Contractor will not be compensated for any cost related to purchasing extended warranties to meet this requirement. See Special Work Requirements for project schedule information.

Y. Contractors shall maintain accurate as-built construction records and provide complete clean and legible copies to Construction Manager on completion of work. All Contractors will be required to provide electronic copies as well as hard copies of all O&M's and as-built drawings. See Project Manual for additional Closeout requirements.

END OF SECTION 01 01202

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, and include a statement such as “or equal”, “equal to”, “equivalent to”, or “basis of design”, a substitute product will be considered when written request is received by the date and time identified in Section 00 2113 INSTRUCTIONS TO BIDDERS.
B. 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.
C. Subsequently, substitutions 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).
D. 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.
E. 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.
F. 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.

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 CONSENSUDOCS 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 EADOC 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 and labor cost. Identify site mobilization, bonds and insurance.
   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. Notarize and execute by a person authorized to sign legal documents on behalf of the Trade Contractor. 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 issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for the portion of the Work claimed as substantially complete.
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 such other retainage as the engineer shall determine for all incomplete work and unsettled claims will be authorized.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION

SECTION 01 3100.01

WEB BASED CONSTRUCTION MANAGEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Owner and Contractor shall utilize **Bentley Systems, Inc. EADOC** system for electronic submittal of all data and documents (unless specified otherwise by the owner's representative) throughout the duration of the Contract. **EADOC** is a web-based electronic media site that is hosted by **Bentley Systems, Inc.**, utilizing their **EADOC** web solution. **EADOC** 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. **EADOC** 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. **EADOC** is a registered trademark of **Bentley Systems, Inc**.

1.02 USER ACCESS LIMITATIONS

A. The Owner's Representative/Construction Manager will control the Contractor's access to **EADOC** 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 **EADOC** through the Contractor. Entry of information exchanged and transferred between the Contractor and its sub-contractors and suppliers on **EADOC** 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 **EADOC** 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 **EADOC** 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 **EADOC** system as recommended by **Bentley Systems, Inc**. to access and utilize **EADOC** . As recommendations are modified by **EADOC**, 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 **EADOC** 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. **EADOC** 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 EADOC 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 **EADOC** to the maximum extent possible. If a form does not exist in **EADOC** 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 **EADOC** (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 **EADOC** 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 **EADOC.**

1.06 CONNECTIVITY PROBLEMS

A. **EADOC** 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. **EADOC** 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 **EADOC** 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 **EADOC** 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 **EADOC** 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. EADOC project management application (no equal) Provided by Bentley Systems, Inc. www.EADOCsoftware.com

PART 3 - EXECUTION

3.01 EADOC UTILIZATION

A. **EADOC** 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 **EADOC** 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 **EADOC** 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 EADOC 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 EADOC 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 EADOC. 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 **EADOC** 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 EADOC 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 **EADOC.** Supporting material for Pay Applications and Change Requests shall be submitted on **EADOC** 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 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

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 EADOCs:

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 progress of the work at 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 EADOC 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 EADOC.
   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 EADOC, 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 #

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 EADOC, 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 "EADOCS".
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 "EADOCS".
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 “EADOCS”. 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 EADOC.

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. 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. Use of facility restrooms will be permitted on the project.

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 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: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
3. Products specified by naming one or more manufacturers with a provision for substitutions: Submit a request for substitution for any manufacturer not named by the date specified in this project manual.

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 EADOC.
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 EADOC.
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 be 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 EADOC 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 EADOC 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 EADOC.
      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 EADOC.

END OF SECTION

Substantial Completion Project Checklist

Date: _____

DAS Project Number: _____
Project Title: _____
Location: _____
Contractor: _____

In order to process the final (100% pay app/not retainage) payment on a Capital Project, the Department of Administrative Services and State Accounting Enterprise needs the following information. Please complete this form and obtain the necessary documents.

Have all state inspections been completed and documentation uploaded to EADOC?
(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**
Test & Balance Reports	❑ **Yes**	❑ **No**	❑ **N/A**
Other: _____	❑ **Yes**	❑ **No**	❑ **N/A**

❑ **Occupancy Permit if applicable**

❑ **Certificate of Substantial Completion completed in EADOC (Consensus Docs 814)**

Are there any disputes with the above mentioned vendor which need resolution?
❑ **Yes (provide description below)** ❑ **No**

_____

_____

Can final (100% pay app/not retainage) payment be released? ❑ **Yes** ❑ **No**

Final Completion Project Checklist

Date: _____

DAS Project Number: _____
Project Title: _____
Location: _____
Contractor: _____

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

Notification Letter to all Subs and Suppliers of Application for Retainage uploaded into EADOC? ❑ Yes ❑ No

Have all Warranties been received? ❑ Yes ❑ No

Have you received the Operations and Maintenance Manuals? ❑ 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 EADOC? ❑ Yes ❑ No

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

❑ 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 completed in EADOC (Consensus Docs 815)

Are there any disputes with the above mentioned vendor which need resolution?
❑ Yes (provide description below) ❑ No

_____

_____

Can retainage payment be released? ❑ Yes ❑ No

SECTION 26 0400

COMMON REQUIREMENTS FOR ELECTRICAL

PART 1 GENERAL

1.1 SUMMARY

A. This section describes the general requirements of these specifications and shall apply to all phases of the work specified, shown on the drawings, or required to provide for complete installation of all systems for this project.

B. This Section includes basic materials and methods to complement other Division 26 Sections.

1.2 WARRANTIES

A. Warrant materials, workmanship and equipment against defects for a period of one year after the date of substantial completion.

B. Certain equipment shall be warranted beginning at the time of final acceptance or for longer periods of time as specified in those divisions of the Project Manual.

C. Repair or replace, at no additional cost to the Owner, any item which may become defective within the warrant period.

D. Any manufacturers' warranties concerning any item installed will run to the benefit of the Owner.

E. The Contractor agrees not to void or impair, or to allow Sub-Contractors to void or impair, any warranties regarding products or items installed as part of this project.

F. The repair of faulty workmanship shall be considered to be included in the contract.

1.3 ALTERNATES

A. Alternates, if required, shall be as described in the “Alternates” section of this Project Manual, as described on the proposal form, or as indicated on the drawings.

1.4 QUESTIONS OF INTERPRETATION DURING BIDDING PHASE

A. If questions arise during the bidding process regarding the meaning of any portion of the contract documents, the prospective bidder shall submit the questions to the Engineer for clarification.

B. Any definitive interpretation or clarification of the contract documents will be published by addenda, properly issued to each person holding documents, prior to the bid date.

C. Verbal interpretation or explanation not issued in the form of an addendum shall not be considered part of the bidding documents.

D. When submitting questions for clarification, adequate time for issuance and delivery of addenda must be allowed.

E. The Engineer shall be the sole judge regarding interpretations of conflicts within contract documents.

1.5 CONTRACT DOCUMENT DISCREPANCIES

A. If any ambiguities should appear in the contract documents, request clarification from the Engineer before proceeding with the work.

B. If the Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out the work in a manner satisfactory to the Engineer.

C. Should a conflict occur within the contract documents, the Contractor is deemed to have estimated the more expensive way of doing the work unless a written clarification from the Engineer was requested and obtained before submission of proposed methods or materials.

D. The Engineer shall be the sole judge regarding interpretations of conflicts within contract documents.

1.6 DEFINITIONS

A. The following definitions shall apply throughout the contract documents:
1. Engineer: Architect or Engineer
2. Code: Applicable national, state and local codes
3. Mechanical: Plumbing, HVAC, & fire protection work required by the Contract Documents
4. Electrical: Electrical and fire alarm work required by the Contract Documents
5. Contractor: Any Contractor performing work required by the Contract Documents
6. Indicated: Noted, scheduled or specified
7. Selected: Selected by the Engineer.
8. Provide: Furnish, install, connect and tested complete and ready for use
9. Furnish: Supply and deliver to the site ready for installation
10. Install: Install complete, per Contract Documents and manufacturer's requirements.
11. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.
12. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
13. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
14. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
15. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
16. Dry Locations: A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction.
17. Damp Locations: Locations protected from weather and not subject to saturation with water or other liquids but subject to moderate degrees of moisture.
    a. Examples of such locations include partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns, and some cold storage warehouses.
18. Wet Locations: Installations underground or in concrete slabs or masonry in direct contact with the earth; in locations subject to saturation with water or other liquids, such as vehicle washing areas; and in unprotected locations exposed to weather.

1.7 SYMBOLS

A. Items of equipment and materials are indicated on the drawings in accordance with the symbols on the plans.

1.8 ABBREVIATIONS

A. Refer to abbreviations list on the Drawings.

B. The following abbreviations apply throughout the Contract Documents:
   1. ADA: Americans with Disabilities Act
   2. ANSI: American National Standards Institute
   3. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers
   4. ASME: American Society of Mechanical Engineers
   5. ASTM Specification: Standard specifications of the American Society for Testing Materials
   6. FM: Factory Mutual Engineering Corporation
   7. IRI: Industrial Risk Insurers
   8. NEC: National Electrical Code, latest edition
   9. NEMA: National Electrical Manufacturers Association
   10. NFPA: National Fire Protection Association
   11. UL or Underwriters: Underwriters Laboratories, Inc.

1.9 CODES

A. The work shall be performed by persons skilled in the trade involved and shall be done in a manner consistent with normal industry standards.

B. The work shall conform to all applicable sections of currently adopted editions of the following codes, standards, and specifications:
   1. International Building Code (IBC)
   2. International Fire Code (IFC)
   3. International Energy Conservation Code (IECC)
   4. Safety and Health Regulations for Construction
   5. Occupational Safety and Health Standards (OSHA), National Consensus Standards and Established Federal Standards
   6. National Electrical Code (NEC)
   7. National Electrical Safety Code (NESC)
   8. National Fire Protection Association (NFPA)
   9. Life Safety Code (NFPA 101)
   10. Factory Mutual Global Engineering (FMG)
   11. Underwriters' Laboratories, Inc. (UL)
   12. National Electrical Manufacturers Association (NEMA)
   13. Institute of Electrical and Electronics Engineers (IEEE)
   14. Insulated Power Cable Engineers Association (IPCEA)
   15. Electronic Industries Association (EIA)
   16. Telecommunications Industry Association (TIA)
   17. Building Industry Consulting Service International (BICSI)
   18. Applicable national, state and local codes

C. Where there is a conflict between the code and the Contract Documents, the code shall have precedence only when it is more stringent than the Contract Documents.
   1. Items that are allowed by the code but are less stringent than those specified shall not be substituted.

1.10 PERMITS

A. The Contractors shall familiarize themselves with requirements regarding permits, fees, etc., and shall comply with them.

B. Permits, licenses, inspections and arrangements required for the work shall be obtained by the Contractor at his expense.

C. Utilities shall be installed in accordance with the local rules and regulations. Charges shall be paid by the Contractor.

1.11 MATERIALS AND EQUIPMENT MANUFACTURERS

A. Options in selecting materials and equipment are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced on previous construction projects.

B. Materials and equipment shall be provided in accordance with the following:
   1. Primary Design Products: Primary design products are those products around which the project was designed in terms of capacity, performance, physical size and quality.
   2. Primary design products are indicated by use of a single manufacturer's name, model number or similar data on drawings or schedules or within the specifications.
   3. Provide primary design products unless substitutions are made in accordance with the following paragraphs.
   4. Acceptable Equivalent Substitutions: Acceptable equivalent substitutions are products of manufacturers other than those listed for the primary design products. Equivalent acceptable substitutions shall meet each of the following requirements:
      a. The product shall be manufactured by one of the acceptable manufacturers listed in the Project Manual, drawings, or addenda.
      b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance, and physical characteristics.
      c. The Contractor providing the substitution shall bear the total cost of changes due to substitutions. These costs may include additional compensation to the Engineer for redesign and evaluation services, increased cost of work by the Owner or other Contractors, and similar considerations.
   5. Performance Requirements: Where the contract documents list performance requirements or describe a product or assembly generically, provide products that comply with the specific requirements indicated and that are recommended by the manufacturer for the respective application.
   6. Compliance with Standards, Codes and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations.

C. Proposed substitutions will be judged on the basis of quality, performance, appearance and on the governing space limitations. The reputation of the manufacturer, delivery time requirements, and the availability of repair or replacement parts may also be considered.

D. The Engineer shall be the sole and final judge as to the suitability of substitution items.

1.12 SUBMITTALS

A. Shop Drawings, Product Data and Samples:

1. Other sections in the Project Manual shall be adhered to if more stringent than the following paragraphs.
2. When required by other sections of this Project Manual, submit shop drawings, product data or samples to the Engineer for review.
3. Submittals deemed unnecessary by the Engineer shall be returned indicating “No Action Taken”.
4. A completed copy of the transmittal form included with the Project Manual shall accompany each submittal.
5. Submittals shall be numbered consecutively.
6. Unless otherwise noted, submit one copy electronically of shop drawings and product data for review. Review comments will be returned electronically. A hard copy of the electronic submittal will be returned if requested.
7. Where samples are required, submit one (1) sample of each required item.
8. Shop drawings are drawings, diagrams, schedules and other data specifically prepared for this project by the Contractor, Manufacturer, Supplier, or Distributor to illustrate some portion of the work. Shop Drawings shall also detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.
    a. Shop drawings shall be drawn to accurate scale and of adequate size to illustrate required details.
9. Product data are illustrations, standard schedules, performance charts, instruction brochures, diagrams and other information furnished by the Contractor, Manufacturer, Supplier, or Distributor to illustrate a material, product or system for some portion of the work.
10. Samples are physical examples furnished by the Contractor, Manufacturer, Supplier, or Distributor to illustrate materials, equipment or workmanship and to establish the standards by which the work will be performed.
11. Each submittal shall clearly indicate proposed items, capacities, characteristics and details in conformance with contract documents. Equipment items shall be marked with the same item number as used on drawings or schedules. Capacities, dimensions and special features required shall be certified by the manufacturer.
12. Submittals shall indicate manufacturer's delivery time for the item after review by the Engineer.
13. When required by other sections of this Project Manual, the Contractor shall submit a Specification Compliance Review consisting of a paragraph-by-paragraph review of the specifications and addenda with the following marked for each paragraph. Markings may be made in the margins of the original specification or addenda. Unless a deviation or exception is specifically noted in the Specification Compliance Review, it is assumed that the equipment, product, or material is in complete compliance with the contract documents. Submit Specification Compliance Review with shop drawings and product data.
    a. “C”: Comply with no exceptions.
    b. “D”: Comply with minor deviations. For each deviation, provide the reasons for the deviation and how the intent of the specification can be satisfied.
    c. “E”: Exception. Equipment, product, or material does not comply. For each exception, provide reasons for the exception, and suggest possible alternatives for the Owner’s consideration.
    d. “N/A”: The paragraph does not apply to the proposed equipment, product, or material.

14. The Engineer shall review or take other appropriate action upon the Contractor's submittals such as shop drawings, product data and samples, but only to determine conformance with the design concept of the work and the information given in the contract documents.
15. Contractor shall not be relieved of responsibility for any deviation from the requirements of the contract documents by the Engineer's review of shop drawings, product data or samples.
16. Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings, product data or samples by the Engineer's review of those drawings.
17. No portion of the work requiring submission of a shop drawing, product data or sample shall be commenced until the submittal has been reviewed by the Engineer. Such portions of the work shall be in accordance with reviewed submittals.
18. The successful Contractor/Supplier may, at their option, obtain DXF or AutoCad DWG electronic drawing files for use in preparation of shop drawings.
    a. This information is available from Alvine Engineering upon written request.
    b. A non-refundable handling charge of $10.00 per drawing file requested will be required at the time of receipt of the electronic files.
    c. The use of these drawing files is intended solely for the preparation of drawings as required by these contract documents.
    d. Any other use is strictly prohibited by copyright laws.
    e. The user of these electronic drawing files assumes full responsibility for their accuracy and scale.

B. Operation and Maintenance Manuals:
1. Prepare three (3) operation and maintenance manuals for the equipment furnished. Manuals shall be submitted to the Engineer for review and distribution to the Owner not less than 30 days prior to substantial completion of the project. Manuals not meeting the following requirements may be rejected by the Engineer.
2. Each manual shall be assembled in a three-ring binder with hard cover and plastic finish. Binders shall not exceed a 3-inch thickness. Where more than one binder is required, the manuals shall be separated into a logical grouping, i.e., “Mechanical”, “Electrical”, “Maintenance”, “Operation”, “Parts”, Shop Drawings”, etc. Each binder shall have the following information clearly printed on its front cover:
    a. Project name and address.
    b. Portion of the work covered by each volume (if more than one volume in the set). Where more than one volume is required, label each volume as “Volume _____ of _____”.
    c. Name, address and telephone number of Contractor and Sub-Contractors including night or emergency number.
3. Manual shall include, but shall not be limited to, the following:
    a. A Complete Index. Contractor may submit the index to the Engineer for review prior to submittal of complete manuals if desired.
    b. Names, Addresses and Telephone Numbers. This list shall include the manufacturer and local representative who stocks or furnishes repair parts for all items of equipment and shall be typed on a single page in front of the binder.
    c. Startup, Operation and Shutdown Procedures. Provide a written description of procedures for startup, operation and shutdown of each electrical item or system. This description shall include switches to operate, buttons to push, etc., in proper sequence, and the location of switches, starters, and pushbuttons. Description shall include item

references or labels used in the contract documents unless otherwise instructed in advance by the Owner.

d. Equipment Accessory Schedule. Upon completion of the work, furnish the Owner with a complete equipment accessory schedule listing each piece of equipment and the related size, type, number required and the manufacturer of renewable items.

e. Manufacturer's Operation and Maintenance Manuals and Parts Lists.

f. Emergency Procedures. Provide a written description of emergency operating procedures or a list of service organizations (including addresses and telephone numbers) capable of rendering emergency services to the various parts of the system.

g. One copy of shop drawings and product data, clearly marked for each item furnished using the designation label specified or indicated on Drawings.

h. Manufacturers' warranty information.

i. Normal Maintenance Schedule. Include a listing of work to be performed at various time intervals; i.e., 30, 90, 180 days and yearly.

1.13 OPERATING TRAINING

A. Complete operating instructions for each system and item of equipment shall be provided to the Owner's designated personnel.

B. Operation and Maintenance Manuals must be reviewed and accepted by the Engineer and provided to the Owner prior to operating training.

C. Training shall be scheduled at the convenience of the Owner. A minimum of 4 hours of training shall be provided.

D. Training shall include instructions on the following:
1. Startup and shutdown procedures
2. Periodic maintenance
3. Emergency operation
4. Safety

E. In addition to the instructions required above, wherever possible perform the operations being described in order to fully illustrate system operation.

F. At the completion of training, turn over to the Owner required keys and special tools for installed equipment. Each key or tool shall be labeled with its use.

1.14 QUALITY ASSURANCE

A. Conform to the requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.15 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, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
   1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

C. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.

D. Coordinate electrical service connections to components furnished by utility companies.
   1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
   2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.

E. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.

F. Coordinate electrical testing of electrical, mechanical, and architectural items, so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.

G. Provide offsets and elevation changes in conduit and cable tray as required to complete the Layout and Coordination Process.

1.16 STRUCTURAL COORDINATION

A. In cases where the Contractor determines that superimposed loads such as suspended or floor mounted mechanical, electrical, plumbing system or equipment exist which exceed design loads indicated on structural contract documents, Contractor shall submit load data to Engineer for review prior to proceeding with work.

B. Distribute the maximum load hung from any structural member for mechanical, electrical, plumbing, ductwork, piping, etc. over the member's tributary area in a way that the design superimposed dead loads listed in structural contract documents are not exceeded. The Contractor shall coordinate the loads and provide additional support or distribution framing as required achieving the allowable load distribution.

C. Connections of systems designed by Contractor's engineer such as, but not limited to mechanical, electrical, plumbing loads are assumed to impose vertical and/or horizontal loads on the base building structural members without generating torsion in the supporting structural members. Contractor is responsible for furnishing and installing all supplementary bracing members as required to prevent torsion on the base building structure.

PART 2 PRODUCTS

2.1 PERFORMANCE, CAPACITIES AND CHARACTERISTICS

A. See Drawings for Equipment Schedules for Equipment Performance Requirements when capacities and characteristics are not indicated in the specifications.

2.2 EQUIPMENT SHORT CIRCUIT CURRENT RATING

A. Where the National Electrical Code or applicable codes require equipment to be marked with a Short Circuit Current Rating (SCCR), the equipment shall be manufactured as required such that the SCCR of the equipment meets or exceeds the available short circuit current at the equipment. Acceptable methods of complying with this requirement are as follows:
   1. Provide SCCR rating at the equipment that meets or exceeds the available short circuit current at the switchboard or panelboard where the equipment circuit originates.
   2. Provide calculations, based on the available short circuit current at the switchboard or panelboard where the equipment circuit originates, that document the actual short circuit current available at the equipment. The SCCR rating of the equipment shall meet or exceed this calculated value.

2.3 MATERIALS

A. Unless otherwise specified, all materials and equipment shall be new, unused and undamaged. Materials and equipment shall be the current and standard designs of manufacturers regularly engaged in their production.

2.4 MATERIALS AND EQUIPMENT FURNISHED BY OTHERS

A. Where materials and equipment are indicated as furnished by others and installed or connected under this contract, it shall be the Contractor's responsibility to verify installation details and requirements.

2.5 QUANTITY OF SPECIFIED ITEMS REQUIRED

A. Wherever in these specifications an article, device or piece of equipment is referred to in the singular number; such reference shall apply to as many such articles as are shown on the drawings or required to complete the installation.

2.6 SLEEVES

A. Steel Pipe: ASTM A53, Type E, Grade B, Schedule 40, galvanized, plain ends.

2.7 ACCESS DOORS

A. Manufacturers:
   1. Access Doors:
      a. J. L. Industries
      b. Karp Associates, Inc.
      c. Larsons Mfg. Co.
      d. Milcor, Inc.
      e. Miller Limited Partnership
      f. Nystrom, Inc.

B. Prime coated 14 gauge steel, flush, with screwdriver operated cam lock, frame to accommodate construction type; size as indicated.

PART 3 EXECUTION

3.1 GENERAL

A. Fabrication, erection, and installation of the complete electrical system shall be done by qualified personnel experienced in such work and shall proceed in an orderly manner so as not to hold up the progress of the project.

B. Check areas and surfaces where electrical equipment or materials are to be installed and report any unsatisfactory conditions before starting work.

C. Commencement of work signifies the Contractor's acceptance of the conditions as fit and proper for the execution of the electrical work.

D. Install equipment and systems in accordance with manufacturer's instructions, requirements, or recommendations.

E. Comply with NECA 1.

F. Unless otherwise noted, measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

G. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

H. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

I. Right of Way: Give to raceways and piping systems installed at a required slope.

J. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

3.2 DELIVERY AND STORAGE OF MATERIALS

A. Make provisions for the delivery and safe storage of materials. Make the required arrangements with other contractors for the introduction into the building of equipment too large to pass through finished openings.

B. Materials shall be delivered at such stages of the work as will expedite the work as a whole and shall be marked and stored in such a way as to be easily checked and inspected.

C. Adequately protect supplies and equipment during cold weather.

D. Protect items subject to cold weather damage by covering, insulating, or storing in a heated space.

3.3 COOPERATION WITH OTHER CONTRACTORS

A. Perform the electrical work in conformance with the construction called for by other trades and afford other contractors reasonable opportunity for the execution of their work.

B. Properly connect and coordinate the electrical work with the work of other contractors at such time and in such a manner as not to delay or interfere with their work.

C. Examine the contract documents for the General, Mechanical, and Electrical work and the work of other trades. Coordinate work accordingly.

D. Promptly report to the Engineer any delay or difficulties encountered in the installation of the electrical work which might prevent prompt and proper installation of work required from other trades.

3.4 COORDINATION OF WORK

A. Plan work so it proceeds with a minimum of interference with other trades.

B. Inform the General Contractor of all openings required in the building construction for the installation of the electrical work.

C. Cooperate with other contractors in furnishing material and information, in proper sequence, for the correct location of sleeves, inserts, foundations, wiring, etc.

D. Make provisions for special frames, openings, and sleeves as required.

E. The Electrical Contractor shall pay for extra cutting and patching made necessary by his failure to properly direct such work at the correct time.

3.5 LAYING OUT WORK

A. Carefully lay out work in advance of installation using data and measurements from the site, the appropriate architectural and structural drawings, and shop drawings.

B. Confirm code required clearances.

C. Do not infringe upon space required for operation, maintenance, or clearance for items installed by other contractors.

D. Prior to installation of any work, make certain the location does not conflict with other items in or near the same location.

E. If the layouts so prepared indicate that the required conditions cannot be met in the space provided, inform the Engineer prior to installation and request clarification.

F. Failure to properly coordinate and lay out work will require correction by the Contractor at the Contractor's expense

3.6 DATA AND MEASUREMENTS

A. Mechanical and electrical drawings are diagrammatic or schematic. Do not scale drawings.

B. The data given herein and on the drawings is as accurate as could be secured; absolute accuracy is not guaranteed.

C. Obtain exact locations, measurements, levels, etc., at the site and adapt their work to actual conditions.

D. Examine the general construction, mechanical, electrical, and other applicable drawings and the Specifications.

E. Utilize only architectural drawings, structural drawings, and site measurements in calculations.

F. Layout and coordinate work prior to installation to provide clearances for operation, maintenance and codes. Verify non-interference with other work.

G. Locate outlets and devices mounted on finished surfaces with regard to paneling, furring, trim, etc.

H. Install outlets and devices with vertical edges of plates plumb.

I. Install boxes or plaster rings such that the front edge extends to the finished surface of the wall, ceiling or floor without projecting beyond the surface.

J. Install receptacles, switches, etc., on wood trim, cases, or other fixtures symmetrically and, where necessary, install with the long dimension of the plate horizontal.

K. Coordinate locations of outlets and devices with other contractors so as not to destroy the aesthetic effect of the surface in which the outlets and devices are mounted. Coordinate the locations of electrical items with work furnished by other trades to avoid interference.

L. Heights of outlets are measured from finished floor to centerline of device.

M. Adjust heights as necessary to clear wall-mounted cabinets, fin tube convectors, unit heaters, etc.

N. Mounting heights shall be in compliance with ADA requirements.

O. Install outlets at the heights indicated below unless otherwise noted.
1. Wall switches: 46 inches.
2. Receptacle outlets (general): 18 inches.
3. Receptacle outlets (kitchen, utility room, workbenches, etc.): 46 inches.
4. Communications outlets: 18 inches.
5. Communications outlets (wall phones): 46 inches.
6. TV outlets: 18 inches.
7. Pushbuttons: 46 inches.
8. Clock outlets: 98 inches when possible Allow space below ceiling to service or replace. Above doors, center between door trim and ceiling.
9. Bells, buzzers, chimes: 8 inches below ceiling (field verify with Engineer unless noted otherwise).
10. Fire alarm station: 46 inches.
11. Fire alarm visual signals and audible/visual signals, wall-mounted: 80 inches to the bottom of the lens unless local code or ADA requirement mandates a lower mounting height.
12. Fire alarm audible signals, wall-mounted: Match height of audible/visual signals.
13. Exit lights: 4 inches between top of door frame and bottom of exit sign where possible.

P. The mounting heights of disconnect switches, circuit breakers, motor controllers, pushbutton stations and other similar devices and equipment may vary depending upon location and whether individually or group mounted.

Q. For convenience and safety, mount equipment with the center of operating levers, handles or buttons no more than 72 inches above the finished floor.

R. Locate individual devices or pieces of equipment, unless otherwise specified, so the operating handle, lever or button is located approximately 5 feet above finished floor. Coordinate heights of electrical items with work furnished by other trades to avoid interferences.

S. Improperly located devices or outlets shall be relocated by the Contractor at the Contractor’s expense including necessary patching.

3.7 PROTECTION OF APPARATUS

A. Take necessary precautions to properly protect apparatus, fixtures, appliances, material, equipment, and installations from damage.

B. Failure to provide such protection to the satisfaction of the Engineer shall be sufficient cause for the rejection of any particular piece(s) of material, apparatus, equipment, etc., concerned.

3.8 SLEEVE INSTALLATION

A. Coordinate sleeve selection and application with selection and application of firestopping.

B. Concrete Slabs and Walls: Install sleeves during erection of slabs and walls. Space sleeves a minimum of three sleeve diameters on center, unless otherwise noted. Sleeves are not required for core-drilled penetrations.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Sleeves through walls: Install flush with both surfaces of wall.

E. Sleeves through floors: Extend 2 inches above finished floor.

F. Sleeves through roofs: Seal with flexible boot-type flashing units applied in coordination with roofing work

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceways or cable unless sleeve seal is to be installed.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.

J. Underground, Exterior-Wall Penetrations: Size sleeves to allow for appropriate clear space between raceway and sleeve for sleeve seals.

3.9 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to maintain fire-resistance rating of assembly.

3.10 WORK IN EXISTING BUILDINGS

A. Execute work in the existing building, indicated on the drawings or specified herein, with a minimum amount of interference with the normal activities of the occupants of the building.

B. Schedule work in advance with the Owner and proceed only with the Owner’s written approval.

C. Utilities:
   1. Do not interrupt utilities without the Owner’s prior written approval regarding the time and duration of such interruptions.
   2. Do not disconnect utilities to existing facilities until new or temporary facilities are installed except for short periods of interruption which are necessary for the performance of the new work and which are approved by the Owner.
   3. Storm water may be temporarily diverted to surface drainage provided such drainage is arranged to prevent flooding of structures, basements and excavations for construction.

D. Fire Alarm System:
   1. As a minimum, maintain the existing degree of protection for all areas throughout construction.
   2. Coordinate required outages with the Owner and the Fire Marshal.
   3. After any additions or modifications to the fire alarm system, a re-acceptance test shall be performed by a licensed party in accordance with NFPA 72.

E. Welding:
   1. Notify the Owner before starting welding or cutting.
   2. Fire extinguishers shall be immediately accessible when welding or cutting with an open flame or arc.
   3. Stop operations involving welding or cutting with an open flame or arc not less than one hour before leaving the premises.

F. Noisy Operations:
   1. Schedule noisy operations, such as those involving use of air hammers, etc., in demolition or cutting of openings, with the Owner.

G. Occupancy:
   1. The Owner will continue to occupy the building and carry on normal activity.
   2. Protect the occupied areas from dust, smoke, etc., by a method reviewed by the Engineer.

H. Owner's Right to Direct Work: The Owner shall have the right to direct the places of beginning work, its prosecution, and the manner in which all work under this contract is to be conducted, insofar as may be necessary to secure the safe and proper progress and quality of the work.

I. Existing Conduits or Electrical Equipment:
   1. Remove or relocate, as required, or as directed by the Engineer, existing conduit or electrical equipment which would interfere with the proper installation of new work.
   2. Modify existing work in conformance with these specifications.
   3. Use the same materials as for new work unless otherwise specified.

3.11 DEMOLITION AND REMODEL

A. Protect existing electrical equipment and installations indicated to remain.

B. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

C. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

D. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

E. Remove demolished material from Project site.

F. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

G. Remove existing lights, receptacles, switches, etc., indicated on plans or which are not indicated but must be removed to accommodate demolition or new remodeling.

H. Where existing walls are indicated to be removed, disconnect power to electrical devices and associated appurtenances relating to the walls.

I. Maintain circuit continuity up and down stream from removed outlets.

J. Extend circuiting to up and downstream devices and reconnect as required.

K. Where existing site lighting fixtures are removed, verify the routing of existing circuits. Maintain circuit continuity between existing fixtures which remain.

L. In areas which are remodeled, replace existing wire with new wire. No existing wire is permitted to remain unless noted.

M. Existing concealed conduit and boxes may be reused.

N. Verify existing conditions in field prior to bid date.

3.12 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations.

B. Perform cutting by skilled mechanics of trades involved.

C. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces.

D. Install new fireproofing where existing firestopping has been disturbed.

E. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.13 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work. Repair as necessary.

3.14 CLEANING AND PROTECTION

A. Remove burrs, dirt, paint spots, and construction debris from electrical items.

B. Protect electrical items so that finishes are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

D. TIA/EIA-607 - Commercial Building Grounding and Bonding Requirements for Telecommunications

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.4 DEFINITIONS

A. TMGB: Telecommunications Main Grounding Busbar

B. TGB: Telecommunications Grounding Busbar

C. TBB: Telecommunications Bonding Backbone

D. ACEG: Alternating Current Equipment Ground

E. TBC: Telecommunications Bonding Conductor

F. TBBIBC: Telecommunications Bonding Backbone Interconnecting Bonding Conductor

1.5 SUBMITTALS

A. Product Data: Provide for ground bars.

B. Telecommunications Grounding Test Reports.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Comply with TIA/EIA-607 for telecommunications grounding.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. 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.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
1. Use insulated copper conductors unless otherwise indicated.
a. Exceptions:
1) Use bare tinned 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 or high-pressure compression conections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors or compression connectors for accessible connections.

a. Exceptions:
1) Use exothermic welded connections or high-pressure compression connections for connections to metal building frame.

4. Manufacturers - High-Pressure Compression Connectors:
a. Burndy: www.burndy.com; Hyground System
b. Thomas & Betts: www.tnb.com.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Make grounding and bonding connections using specified connectors.
1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 26 0553.

3.3 TELECOMMUNICATIONS GROUNDING

A. Install each bonding conductor in the most direct route possible without interfering with other systems or equipment.

B. Install exterior grounding electrode conductors with a minimum bending radius of 12 inches.

C. Install interior grounding conductors with a minimum bending radius of 8 inches.

D. Install grounding conductors in EMT conduit unless otherwise indicated. Bond each end of the conduit to the grounding conductor using an appropriate grounding bushing.

E. Provide compression lugs for terminations. For #6 AWG and smaller, use one-hole lugs. For #4 AWG and larger, use two-hole lugs.

F. When present, bond the following to the TMGB:
1. Metal raceways and cable trays for telecommunications cabling extending from the room where the TMGB is located.

2. Metallic equipment racks.

G. When present, bond the following to the nearest TGB:
1. Panelboards located in the same room as the TGB. Use ACEG connected to panelboard ground bus.
2. TGBs within the same space.
3. TBBs located on the same floor and terminated to another TGB.
4. Metallic equipment racks.
5. Metallic raceways and cable trays for telecommunications cabling extending from the room or space where the TGB is located.

H. Labeling:
1. Clean each surface prior to attachment of label.
2. Follow manufacturer's recommendations for affixing labels.
3. Ground Bars: Provide engraved laminate with 1-inch high letters. Locate at the upper left-hand side of bar. Engrave with bar designation followed by unique identifier as indicated on drawings.
   a. TMGB-
   b. TGB-
   c. MGB-
4. Conductors: Provide machine-printed, self-adhesive label equivalent to Brady label or Brother P-Touch label. Attache to each accessible end and at each break in the insulation for the cables indicated below. Indicate cable designation followed by unique numeric identifier.
   a. TBC
   b. TBB
   c. TBBIBC
   d. ACEG
   e. Grounding electrode conductors.

3.4 FIELD QUALITY CONTROL

A. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

B. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

C. Telecommunications Grounding system Testing and Documentation.
1. Perform tests based on TIA/EIA-607, "Commercial Building Grounding and Bonding Requirements for Telecommunications" and document results to insure proper grounding of the telecommunications system.
2. Tests require the following:
   a. Equipment set-up and reference test.
   b. Ground electrode resistance testing.
   c. Grounding system continuity test.
   d. Test result documentation.

END OF SECTION

SECTION 26 0533.13

CONDUIT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Flexible metal conduit (FMC).

B. Electrical metallic tubing (EMT).

C. Conduit fittings.

D. Accessories.

1.2 REFERENCE STANDARDS

A. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

F. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.

G. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

H. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
   5. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.4 DEFINITIONS

A. Telecommunications Pathway: Any item, raceway, box or enclosure in which telecommunications cabling is placed.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Outdoor Underground Installations:
   1. Unless otherwise indicated, use rigid non-metallic conduit

C. Outdoor Locations Above Grade: Use electrical metallic tubing.

D. In Slab Above Grade or Beneath Slab-on-Grade:
   1. Use rigid non-metallic conduit.

E. Dry Locations:
   1. Concealed: Use electrical metallic tubing.
   2. Exposed: Use electrical metallic tubing.

F. Connection to Motors: Use liquid-tight flexible metal conduit, except use flexible metal conduit in air plenums.

G. Connection to Vibrating Equipment (including transformers):
   1. Indoors: Use flexible metal conduit.
   2. Outdoors: Use liquid-tight flexible metal conduit.

2.2 CONDUIT REQUIREMENTS

A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 1/2 inch (16 mm) trade size.
   2. Telecommunications Pathways: 1 inch (27 mm) trade size.

D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 FLEXIBLE METAL CONDUIT (FMC)

A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel, malleable iron, or die cast zinc.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

B. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.

2.5 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. Colored EMT:
   1. Manufacturer: Allied Tube and Conduit.
   2. Color Code:
      a. Fire Alarm: Red

C. Fittings:
   1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel, malleable iron, or die cast zinc.
   3. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do not use indenter type connectors and couplings.
   4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

2.6 ACCESSORIES

A. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force (890 N).

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.

5. Unless otherwise approved, do not route conduits exposed:
   a. Across floors.
   b. Across roofs.
   c. Across top of parapet walls.
   d. Across building exterior surfaces.
6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
7. Arrange conduit to maintain adequate headroom, clearances, and access.
8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
9. Exterior Branch Circuits: Route conduits adjacent to curbs. Push or directional bore conduits beneath paved areas; otherwise, sawcut and remove pavement. Replace removed pavement to match existing.
10. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
11. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces.
12. Group parallel conduits in the same area together on a common rack.

D. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 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.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use of spring steel conduit clips for support of conduits is permitted only as follows:
   a. Support of electrical metallic tubing (EMT) 1-1/2 inch trade size concealed above accessible ceilings and within hollow stud walls.
5. Use of wire for support of conduits is permitted only as follows:
   a. For suspending conduits supported by spring steel conduit clips (only where specifically indicated or permitted).

E. Connections and Terminations:
1. Use suitable adapters where required to transition from one type of conduit to another.
2. Provide insulated bushings on box connectors 1-inch and larger, on conduits stubbed above an accessible ceiling, and on conduits used for telecommunications pathways.
3. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

F. 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. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
4. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.

5. 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.
6. Install firestopping to preserve fire resistance rating of partitions and other elements.

G. Conduits Beneath Slab on Grade:
1. Transition to rigid steel conduit, intermediate metal conduit, or electrical metallic tubing where conduit exits slab, except where concealed in walls rigid nonmetallic conduit may be stubbed a maximum of 14 inches above floor level.

H. Conduits Embedded in Concrete Slabs:
1. Install with at least 2 inches of concrete cover.
2. Space a minimum of three diameters on center.
3. Transition to rigid steel conduit, intermediate metal conduit, or electrical metallic tubing where conduit exits slab, except where concealed in walls rigid nonmetallic conduit may be stubbed a maximum of 14 inches above floor level.
4. Do not place raceways in plain concrete, such as cement toppings on structural floors, without special permission. Do not displace reinforcing steel to accommodate raceway installation in reinforced concrete. Particular attention is called to the fact that there are many extenuating conditions where the Contractor may be instructed, during the course of the project, not to place embedded conduits in certain areas, generally due to the possibility of unsightly cracking or for structural reasons. Being so instructed shall not entitle the Contractor to extra compensation. Obtain permission from the Engineer for any raceway installation in reinforced concrete which requires concrete displacement exceeding the following:
   a. Columns: 4 percent of plan area of column.
   b. Floors : 1/3 of thickness of concrete.
   c. Beams and Joists: 1/3 of least dimension.

I. Telecommunications Raceways: Install raceways in maximum lengths of 100 feet and with a maximum of two 90-degree bends or equivalent between boxes or pull points. Separate lengths with pull or junction boxes where necessary to comply with these requirements. Locate junction boxes in straight conduit runs. Do not install junction boxes where conduit runs change direction. Keep telecommunications raceways at least 5 inches away from light fixtures, transformers, panelboards, and feeders. Keep non-metallic telecommunications raceways at least 24 inches away from electrical equipment, feeders, and services.

J. 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 conduits are subject to earth movement by settlement or frost.

K. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide junction box or type C condulet with 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.
3. Where conduits penetrate coolers or freezers.

L. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.

M. Provide grounding and bonding in accordance with Section 26 0526.

N. Identify conduits in accordance with Section 26 0553.

3.3 FIELD QUALITY CONTROL

A. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

A. Immediately after installation of conduit, use suitable caps to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 0533.16

BOXES

PART 1 GENERAL

1.1 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).

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

I. UL 508A - Industrial Control Panels; 2013.

J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
   4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
   5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
   6. Coordinate the work with other trades to preserve insulation integrity.
   7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.

8. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for floor boxes.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.1 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. Do not use "through-wall" boxes designed for access from both sides of wall.
7. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
8. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
9. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
10. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
11. Minimum Box Size, Unless Otherwise Indicated:
    a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
    b. Communications Systems Outlets: 4 inch square by 2-1/8 inch deep trade size.
    c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.

12. Wall Plates: Comply with Section 26 2726.

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.
b. Include cable supports if any dimension of the box is greater than 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 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.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

E. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

F. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

G. Box Locations:
1. Locate boxes to be accessible. Provide access panels as required where approved by the Architect.
2. Unless dimensioned, box locations indicated are approximate.
3. Locate boxes as required for devices installed under other sections or by others.
4. Locate boxes so that wall plates do not span different building finishes.
5. Locate boxes so that wall plates do not cross masonry joints.
6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches (150 mm) horizontal separation unless otherwise indicated.
8. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) horizontal separation.
9. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.

a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.

10. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0533.13.
11. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
    a. Concealed above accessible suspended ceilings.
    b. Within joists in unfinished areas with no ceiling.
    c. Electrical rooms.
    d. Mechanical equipment rooms.

H. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.

I. Install boxes plumb and level.

J. Flush-Mounted Boxes:
1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.

K. Install boxes as required to preserve insulation integrity.

L. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

M. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified.

N. Close unused box openings.

O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

P. Provide grounding and bonding in accordance with Section 26 0526.

Q. Identify boxes in accordance with Section 26 0553.

R. Orient boxes to accommodate wiring devices oriented as specified in Section 26 2726.

S. Orient each box located above an accessible ceiling so the box opening faces down or to one side.

T. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

U. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

V. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches (305 mm) of box.

3.3 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

END OF SECTION

SECTION 26 0533.23

SURFACE RACEWAYS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface raceway systems.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 5 - Surface Metal Raceways and Fittings; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate rough-in locations of outlet boxes provided under Section 26 0533.16 and conduit provided under Section 26 0533.13 as required for installation of raceways provided under this section.
   3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
   4. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install raceways until final surface finishes and painting are complete.
   2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 RACEWAY REQUIREMENTS

A. Provide all components, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.2 SURFACE RACEWAY SYSTEMS

A. Manufacturers:
1. Wiremold, a brand of Legrand North America, Inc: www.legrand.us.

B. Surface Metal Raceways: Listed and labeled as complying with UL 5.

C. Surface Raceway System:
1. Raceway Type: Two channel, painted steel.
2. Length: As indicated on the drawings.
3. Accessory Device Boxes: Suitable for the devices to be installed; color to match raceway.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.

C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install raceways plumb and level.

D. Secure and support raceways in accordance with Section 26 0529 at intervals complying with NFPA 70 and manufacturer's requirements.

E. Close unused raceway openings.

F. Provide grounding and bonding in accordance with Section 26 0526.

3.3 FIELD QUALITY CONTROL

A. Inspect raceways for damage and defects.

B. Correct wiring deficiencies and replace damaged or defective raceways.

3.4 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.5 PROTECTION

A. Protect installed raceways from subsequent construction operations.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Identification for conductors.

1.2 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

B. NFPA 70E - Standard for Electrical Safety in the Workplace; 2017.

1.3 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
   1. Use identification nameplate to identify electrical equipment.
      a. Panelboards:
         1) Identify panelboard name.
         2) Identify power source and circuit number. Include location when not within sight of equipment.
         3) Use typewritten circuit directory to identify load(s) served for panelboards with a door.
         4) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device.
      b. Ground Bars:
         1) Identify ground bar name.
   2. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
   3. Available Fault Current Documentation: Use identification nameplate to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70, including but not limited to the following.
      a. Service equipment.
   4. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
      a. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.

B. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
   2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

C. Identification for Raceways:
   1. Use underground warning tape to identify underground raceways.

D. Identification for Boxes:
   1. Use color-coded box covers to identify specified systems.
      a. Color-Coded Box Covers: Field-painted with two coats of enamel paint per the color code below:
         1) Fire Alarm System: Red.
      b. For exposed boxes in public areas, do not color code.
   2. Use handwritten text using indelible marker to identify circuits enclosed.
      a. For exposed boxes in public areas, provide identification on inside face of cover.

E. Identification for Devices:
   1. Wiring Device and Wallplate Finishes: Comply with Section 26 2726.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Materials:
      a. Indoor Clean, Dry Locations: Use plastic nameplates.
   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.
      a. Color: White text on black background.

B. Identification Labels:
   1. Manufacturers:
      a. Brady Corporation: www.bradyid.com.
      b. Brother International Corporation: www.brother-usa.com.
      c. Panduit Corp: www.panduit.com.
   2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
      a. Use only for indoor locations.
   3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
   1. Minimum Size:
      a. Plastic Nameplates: 1 inch (25 mm) by 2.5 inches (64 mm).
      b. Identification Labels: 0.5 inch (12 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: 3/8 inch.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.2 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 when installed in a finished location.
   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. Boxes: Outside face of cover.
   6. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws or self-adhesive backing and to interior surfaces using self-adhesive backing.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Mark all handwritten text, where permitted, to be neat and legible.

3.3 FIELD QUALITY CONTROL

A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

SECTION 26 0583

WIRING CONNECTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical connections to equipment.

1.2 RELATED REQUIREMENTS

A. Section 26 0533.13 - Conduit.

B. Section 26 0533.16 - Boxes.

C. Section 26 2726 - Wiring Devices.

1.3 REFERENCE STANDARDS

A. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
   2. Determine connection locations and requirements.

B. Sequencing:
   1. Install rough-in of electrical connections before installation of equipment is required.
   2. Make electrical connections before required start-up of equipment.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
   1. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
   2. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

C. Provide receptacle outlet to accommodate connection with attachment plug.

D. Provide cord and cap where field-supplied attachment plug is required.

E. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

F. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

G. Provide final power and control connections for equipment furnished under other Divisions of this specification and for Owner-furnished equipment. Where not specified in mechanical sections of this specification, connect motor controls and associated mechanical equipment as required for a complete and functional control system.

H. Provide interlocks and wiring to and between controls for Owner-furnished equipment, boilers, chillers, pumps, air handling units, fans, rooftop units, furnaces, humidifiers, condensing units, heat pumps, hoods, water treatment systems, chemical feed systems, unit heaters, fan coil units, unit coolers, heat reclaim systems, energy management system, product refrigeration, kitchen equipment, and elevator life safety panels.

I. Verify control wiring requirements with manufacturer certified shop drawings for each piece of equipment or control system and install accordingly. Install control wiring in conduit.

3.3 EQUIPMENT REQUIREMENTS

A. Electric Water Coolers:
   1. Locate receptacle for each electric water cooler so that cord and plug are concealed inside or behind cooler.

B. Temperature Control / Energy Management System Panels:
   1. Provide a dedicated power circuit from the nearest 120 V general purpose panel to each temperature control, energy management system, or data gathering panel.
   2. Coordinate panel quantities and locations with Installing Contractor.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Receptacles.

B. Device plates and box covers.

1.2 RELATED REQUIREMENTS

A. Section 26 0533.16 - Boxes.

1.3 REFERENCE STANDARDS

A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).

B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

E. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
   3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
   4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
   5. Notify Engineer of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:
   1. Do not install wiring devices until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cooper Wiring Devices: www.cooperwiringdevices.com.

B. Hubbell Incorporated: www.hubbell-wiring.com.

C. Leviton Manufacturing Company, Inc: www.leviton.com.

D. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us

E. Source Limitations: Where possible, provide products for each type of wiring device produced by a single manufacturer and obtained from a single supplier.

2.2 WIRING DEVICE FINISHES

A. Device Color: White unless otherwise indicated or required by code; brown in dark brick, wood paneled or dark-finished walls.

2.3 RECEPTACLES

A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498; 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. Acceptable products are listed below for specific device types.

C. Straight Blade Receptacles: 20A, 125V.

Description	Cooper	Hubbell	Leviton	P & S
Simplex	1877	HBL5361	5891	5361
Duplex	BR20	BR20	5362	CRB5362
Duplex tamper resistant	TRBR20	BR20TR	T5362	TR5362
Duplex GFCI	SGF20	GFRST20	GFNT2	2097
Duplex GFCI tamper resistant	TRSGF20	GFTRST20	GFTR2	2097TR
Duplex GFCI weather resistant	WRSGF20	GFWRST20	GFWT2	2097TRWR
Duplex GFCI weather resistant, tamper resistant	WRSGF20	GFTWRST20	GFWR2	2097TRWR
Duplex isolated ground	IG5362	IG20CR	5362-IG	IG5362
Duplex tamper resistant with USB charging ports	TR7756	USB20A5	T5832	TR5362USB
Duplex TVSS	5362S	HBL5362SA	7380	5362SP
Clock hanger	775V	RR151CHI	688	S3713

2.4 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. Screws: Metal with slotted heads finished to match wall plate finish.

B. Wall Plates for Flush Devices: Type 302 or 304, satin finished stainless steel, minimum thickness 0.03 inches.

C. 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

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.
   1. Provide minimum of 24 inches horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.
   2. Where multiple devices are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
   3. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

B. Install wiring devices in accordance with manufacturer's instructions.

C. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

D. 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.

E. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer or by using screw-actuated pressure plate. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

F. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

G. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices unless otherwise indicated.

H. Install wiring devices plumb and level with mounting yoke held rigidly in place.

I. Install wall switches with OFF position down.

J. Install dimmers such that derating is not required.

K. Install vertically mounted receptacles with grounding pole on bottom.

L. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

M. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

N. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas and above accessible ceilings.

3.4 FIELD QUALITY CONTROL

A. Inspect each wiring device for damage and defects.

B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.

C. Test each receptacle to verify operation and proper polarity.

D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

E. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 27 0501

COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section describes the general telecommunications infrastructure requirements of these specifications and applies to all phases of the work specified, indicated on the drawings, or required to provide for the complete installation of telecommunications infrastructure for this project.

1.2 ALTERNATES

A. Alternates, if required, shall be as described in the “Alternates” section of this Project Manual, as described on the proposal form, or as indicated on the drawings.

1.3 QUESTIONS OF INTERPRETATION DURING BIDDING PHASE

A. If questions arise during the bidding process regarding the meaning of any portion of the contract documents, the prospective bidder shall submit the questions to the Engineer for clarification.

B. Any definitive interpretation or clarification of the contract documents will be published by addenda, properly issued to each person holding documents, prior to the bid date.

C. Verbal interpretation or explanation not issued in the form of an addendum shall not be considered part of the bidding documents.

D. When submitting questions for clarification, adequate time for issuance and delivery of addenda must be allowed.

E. The Engineer shall be the sole judge regarding interpretations of conflicts within contract documents.

1.4 CONTRACT DOCUMENT DISCREPANCIES

A. If any ambiguities should appear in the contract documents, request clarification from the Engineer before proceeding with the work.

B. If the Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out the work in a manner satisfactory to the Engineer.

C. Should a conflict occur within the contract documents, the Contractor is deemed to have estimated the more expensive way of doing the work unless a written clarification from the Engineer was requested and obtained before submission of proposed methods or materials.

D. The Engineer shall be the sole judge regarding interpretations of conflicts within contract documents.

1.5 DEFINITIONS

A. Equipment Room (ER): An environmentally controlled centralized space for telecommunications equipment that usually houses a main or intermediate cross-connect.

B. Inside Plant Cable (ISP): That part of the Information Transport System running within a building. This definition does apply to Inside Cable Plant elements passing through any element of the outside plant pathway. Inside plant includes the work area outlet assembly

(WAO), backbone and horizontal cabling, network racks, network equipment and all termination hardware not terminating Outside Plant (OSP) cables.

C. Outside Plant Cable (OSP): That part of the Information Transport System running between buildings, from a building to a definable exterior point, between definable exterior points or from another outside source to the building or exterior definable point. It includes termination hardware, transition splices and any other device into which the cable attaches. The Outside Plant includes underground and overhead cabling.

D. Pathways: A cable distribution system consisting of raceways, cable trays, racks, and ladders; conduits; distribution rings and mechanical cable supporting devices.

E. Telecommunications Cables: Term includes horizontal and backbone copper, fiber optic, and coaxial cabling; copper and optical outside plant cables; copper audio/visual (AV) cables; CATV cables, CCTV cables; building environmental, automation, and security cabling systems.

F. Work Area Outlet (WAO): A connecting device for termination of horizontal media.

G. Telecommunications Spaces: Rooms and areas where telecommunications cabling systems are terminated and telecommunications equipment is installed.

H. Telecommunications Enclosure (TE): A case or housing for telecommunications equipment, cable terminations and cross-connect cabling.

I. Telecommunications Room (TR): An enclosed architectural space for housing telecommunications equipment, cable termination and cross-connect cabling.

1.6 SYMBOLS

A. Items of equipment and materials are indicated on the drawings in accordance with the symbols on the plans.

1.7 ABBREVIATIONS

A. The following abbreviations apply throughout the contract documents:
1. ACR: Attenuation-to-Crosstalk Ratio
2. ADA: Americans with Disabilities Act
3. AFF: Above finished floor
4. ANSI: American National Standards Institute
5. ASME: American Society of Mechanical Engineers
6. ASTM Specification: Standard specifications of the American Society for Testing Materials
7. AWG: American wire gauge
8. BICSI: Building Industry Consulting Service International
9. CATV: Community Antenna Television (cable television)
10. CCTV: Closed Circuit Television (security)
11. CSA: Canadian Standards Association
12. EF: Entrance Facility
13. ELFEXT: Equal level far-end crosstalk
14. EMC: Electromagnetic Compatibility
15. EMI: Electromagnetic interference
16. ER: Equipment Room
17. ETL: Electrical Testing Laboratories
18. FCC: Federal Communications Commission
19. FDDI: Fiber distribution data interface
20. FEXT: Far-end-crosstalk
21. FM or Factory Mutual: Factory Mutual Engineering Corporation

22. FO: Fiber optic
23. GND: Ground
24. HH: Handhole
25. Hz: Hertz
26. IC: Intermediate cross-connect
27. IDC: Insulation displacement connector
28. IDF: Intermediate Distribution Frame
29. ISP: Inside Plant Cable System
30. IEEE: Institute of Electrical and Electronics Engineers
31. LAN: Local area network
32. Mbps: Megabits per second
33. MC: Main Cross-Connect
34. MDF: Main Distribution Frame
35. MH: Manhole
36. MM: Multimode
37. NEC: National Electrical Code, latest edition
38. NEMA: National Electrical Manufacturers Association
39. NFPA: National Fire Protection Association
40. OFE: Owner furnished equipment
41. OFL: Overfilled launch condition
42. OSHA: Occupational Safety and Health Administration
43. OSP: Outside Plant Cable System
44. Pr: Pair
45. PVC: Polyvinyl chloride
46. RCDD: Registered Communications Distribution Designer
47. RFI: Radio Frequency Interference
48. SCS: Structured cabling system
49. ScTP: Screened twisted pair
50. SM: Single mode
51. STP: Shielded twisted pair
52. TBB: Telecommunications bonding backbone
53. TGB: Telecommunications grounding bus bar
54. TMGB: Telecommunications main grounding bus bar
55. TR: Telecommunications Room
56. UL or Underwriters: Underwriters Laboratories, Inc.
57. UPS: Uninterruptible Power Supply
58. UTP: Unshielded twisted pair
59. WAO: Work Area Outlet

1.8 CODES AND STANDARDS

A. The work shall be performed by competent craftsmen skilled in the trade involved and shall be done in a manner consistent with normal industry standards. All work shall conform to all applicable sections of currently adopted editions of the codes and standards listed below or the codes, standards, and specifications published by the organizations listed below:
   1. Safety and Health Regulations for Construction.
   2. Occupational Safety and Health Standards (OSHA), National Consensus Standards and Established Federal Standards.
   3. National Electrical Code (NEC), latest edition.
   4. American National Standards Institute (ANSI).
   5. National Electrical Manufacturer s Association (NEMA).
   6. Institute of Electrical and Electronics Engineers (IEEE).
   7. National Fire Protection Association (NFPA).

8. Insulated Power Cable Engineers Association (IPCEA).
9. American Society for Testing Materials (ASTM).
10. Life Safety Code (NFPA 101).
11. Underwriters Laboratories, Inc., Standards (UL).
12. Independent Testing Laboratories (ITL).
13. Electrical Testing Laboratories (ETL).
14. National Electrical Safety Code (NESC).
15. Factory Mutual Engineering Corporation or other recognized national laboratories.
16. Uniform Building Code (UBC).
17. Building Officials and Code Administrators International, Inc. (BOCA).
18. Building Industry Consulting Service International (BICSI).
19. Telecommunications Industry Association (TIA).
20. State and Local Codes.

B. Where there is a conflict between the code or referenced standards and the contract documents, the code or standard shall have precedence only when it is more stringent than the contract documents. Items that are allowed by the code but are less stringent than those specified shall not be substituted.

1.9 MATERIALS AND EQUIPMENT MANUFACTURERS

A. Options in selecting materials and equipment are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced on previous construction projects.

B. Materials and equipment shall be provided in accordance with the following:
1. Primary Design Products: Primary design products are those products around which the project was designed in terms of capacity, performance, physical size and quality.
a. Primary design products are indicated by use of a single manufacturer's name, model number or similar data on drawings or schedules or within the specifications.
b. Provide primary design products unless substitutions are made in accordance with the following paragraphs.
2. Acceptable Equivalent Substitutions: Acceptable equivalent substitutions are products of manufacturers other than those listed for the primary design products. Equivalent acceptable substitutions shall meet each of the following requirements:
a. The product shall be manufactured by one of the acceptable manufacturers listed in the Project Manual, drawings, or addenda.
b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance, and physical characteristics.
c. The Contractor providing the substitution shall bear the total cost of changes due to substitutions. These costs may include additional compensation to the Engineer for redesign and evaluation services, increased cost of work by the Owner or other Contractors, and similar considerations.
d. Performance Requirements: Where the contract documents list performance requirements or describe a product or assembly generically, provide products that comply with the specific requirements indicated and that are recommended by the manufacturer for the respective application.
e. Compliance with Standards, Codes and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that

complies with specification requirements, including the standards, codes and regulations.

3. Proposed substitutions will be judged on the basis of quality, performance, appearance and on the governing space limitations. The reputation of the manufacturer, delivery time requirements, and the availability of repair or replacement parts may also be considered.
4. The Engineer shall be the sole and final judge as to the suitability of substitution items.

1.10 SUBMITTALS

A. Submittal Requirements:

1. Other section in the Project Manual shall be adhered to if more stringent than the following paragraphs.
2. When required by other sections of this Project Manual, submit shop drawings, product data or samples to the Engineer for review.
3. Submittals deemed unnecessary by the Engineer shall be returned indicating “No Action Taken”.
4. A completed copy of the transmittal form included with the Project Manual shall accompany each submittal.
5. Submittals shall be numbered consecutively by specification section (i.e. 27 0501-01, 27 0501-02).
6. Unless otherwise noted, submit one copy electronically of shop drawings and product data for review. Review comments will be returned electronically. A hard copy of the electronic submittal will be returned if requested.
7. Each submittal shall clearly indicate proposed items, capacities, characteristics and details in conformance with contract documents. Equipment items shall be marked with the same item number as used on drawings or schedules. Capacities, dimensions and special features required shall be certified by the manufacturer.
8. Submittals shall indicate manufacturer's delivery time for the item after review by the Engineer.
9. When required by other sections of this Project Manual, the Contractor shall submit a Specification Compliance Review consisting of a paragraph-by-paragraph review of the specifications and addenda with the following marked for each paragraph. Markings may be made in the margins of the original specification or addenda. Unless a deviation or exception is specifically noted in the Specification Compliance Review, it is assumed that the equipment, product, or material is in complete compliance with the contract documents. Submit Specification Compliance Review with shop drawings and product data.
    a. "A": Reviewed, No Exceptions Taken.
    b. "B": Reviewed, Exceptions Taken as Noted.
    c. "C": Revise and Resubmit.
    d. "D": Rejected.
    e. "E": No Action Taken.
10. The Engineer shall review or take other appropriate action upon the Contractor's submittals such as shop drawings, product data and samples, but only to determine conformance with the design concept of the work and the information given in the contract documents.
11. Contractor shall not be relieved of responsibility for any deviation from the requirements of the contract documents by the Engineer's review of shop drawings, product data or samples.
12. Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings, product data or samples by the Engineer's review of those drawings.

13. No portion of the work requiring submission of a shop drawing, product data or sample shall be commenced until the submittal has been reviewed by the Engineer. Such portions of the work shall be in accordance with reviewed submittals.
14. The successful Contractor/Supplier may, at their option, obtain DXF or AutoCad DWG electronic drawing files on CD-ROM for use in preparation of shop drawings.
    a. This information is available from Alvine Engineering or IP Design Group upon written request.
    b. The use of these drawing files is intended solely for the preparation of drawings as required by these contract documents.
    c. Any other use is strictly prohibited by copyright laws.
    d. The user of these electronic drawing files assumes full responsibility for their accuracy and scale.

B. Pre-Construction Submittals
1. Shop Drawings
    a. Shop drawings are drawings, diagrams, schedules and other data specifically prepared for this project by the Contractor, Manufacturer, Supplier, or Distributor to illustrate some portion of the work. Shop Drawings shall also detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.
    b. Shop drawings shall be drawn to accurate scale and of adequate size to illustrate required details.
    c. Maximum sheet size shall be 30 inches by 42 inches. For each hard copy shop drawing sheet larger than 11 inches by 17 inches, submit one drawing on reproducible media.
    d. The Engineer's action shall be indicated on the reproducible drawing and the drawing shall be returned to the Contractor.
2. Product Data
    a. Product data are illustrations, standard schedules, performance charts, instruction brochures, diagrams and other information furnished by the Contractor, Manufacturer, Supplier, or Distributor to illustrate a material, product or system for some portion of the work.

C. Operation and Maintenance Manuals Submittal:
1. Prepare three (3) operation and maintenance manuals for the equipment furnished. Manuals shall be submitted to the Engineer for review and distribution to the Owner not less than 30 days prior to substantial completion of the project. Manuals not meeting the following requirements may be rejected by the Engineer.
2. Each manual shall be assembled in a three-ring binder with hard cover and plastic finish. Binders shall not exceed a 3-inch thickness. Where more than one binder is required, the manuals shall be separated into a logical grouping, i.e., "Telecommunications", “Audiovisual”, “Maintenance”, “Operation”, “Parts”, "Shop Drawings”, etc. Each binder shall have the following information clearly printed on its front cover:
    a. Project name and address.
    b. Portion of the work covered by each volume (if more than one volume in the set). Where more than one volume is required, label each volume as “Volume _____ of _____”.
    c. Name, address and telephone number of Contractor and Sub-Contractors including night or emergency number.
3. Manual shall include, but shall not be limited to, the following:
    a. A Complete Index. Contractor may submit the index to the Engineer for review prior to submittal of complete manuals if desired.

b. Names, Addresses and Telephone Numbers. This list shall include the manufacturer and local representative who stocks or furnishes repair parts for all items of equipment and shall be typed on a single page in front of the binder.

c. Startup, Operation and Shutdown Procedures. Provide a written description of procedures for startup, operation and shutdown of each electrical item or system. This description shall include switches to operate, buttons to push, etc., in proper sequence, and the location of switches, starters, and pushbuttons. Description shall include item references or labels used in the contract documents unless otherwise instructed in advance by the Owner.

d. Equipment Accessory Schedule. Upon completion of the work, furnish the Owner with a complete equipment accessory schedule listing each piece of equipment and the related size, type, number required and the manufacturer of renewable items.

e. Manufacturer's Operation and Maintenance Manuals and Parts Lists.

f. Emergency Procedures. Provide a written description of emergency operating procedures or a list of service organizations (including addresses and telephone numbers) capable of rendering emergency services to the various parts of the system.

g. One copy of shop drawings and product data, clearly marked for each item furnished using the designation label specified or indicated on Drawings.

h. Manufacturers' warranty information.

i. Normal Maintenance Schedule. Include a listing of work to be performed at various time intervals; i.e., 30, 90, 180 days and yearly.

D. Post-Construction Submittals

1. Field quality-control test reports in PDF format.
2. As-built drawings:
   a. Maintain current documents at the construction site. Submit with Operations and Maintenance Manuals.
   b. As-built drawings shall include the following:
      1) As-built shop drawings
      2) Station outlet numbers.
      3) Routing of cables from equipment cabinets to devices.
      4) Revisions to construction documents (addenda and field changes.)
      5) Floor plans with all final device and equipment cabinet locations and labeling.
3. Cable labeling schedules.
4. When required by specification sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, in quantities specified for shop drawings and equipment brochures.

1.11 OPERATING TRAINING

A. Complete operating instructions for each system and item of equipment shall be provided to the Owner's designated personnel.

B. Operation and Maintenance Manuals must be reviewed and accepted by the Engineer and provided to the Owner prior to operating training.

C. Training shall be scheduled at the convenience of the Owner. A minimum of 4 hours of training shall be provided.

D. Training shall include instructions on the following:

1. Startup and shutdown procedures
2. Periodic maintenance
3. Emergency operation
4. Safety
5. Infrastructure management such as patching process.
6. Infrastructure identification such as patch panel labels.
7. Configuration and setup.Additional training identified in other sections.
8. Additional training identified in other sections.

E. In addition to the instructions required above, wherever possible perform the operations being described in order to fully illustrate system operation.

F. At the completion of training, the Contractor shall turn over to the Owner all required keys and special tools for installed equipment. Each key or tool shall be labeled with its use.

G. Train Owners maintenance personnel in cable-plant management operations including, but not limited to, rerouting signals in failed cables.

1.12 QUALITY ASSURANCE

A. Provide one of the following warranties:
1. CommScope Systimax SCS, 20-year warranty.
2. Panduit Certification Plus 20-year warranty.
3. N-Compass Lifetime (Ortronics/Superior Essex) warranty.
4. CommScope Uniprise warranty.

B. The Contractor shall prepare and submit all required manufacturers performance warranty paperwork to the manufacturer and shall deliver all complete and final warranty information to the owner prior to project close-out.

C. The Contractor shall have an existing quality assurance and quality control plan for the installation. Upon request the Contractor shall submit a quality assurance and control plan for the project.

D. Installer Qualifications:
1. Only installers trained and certified by the manufacturer shall be allowed to install, terminate and test the products. Others may pull/place cable and product only if under the direct supervision of the installer certified and trained by the manufacturer of the product.
2. Installer shall be experienced in all aspects of this work. Installer shall have the manufacturer s recommended number of employees on the job site who have completed the required training courses for the above-mentioned warranties.

E. The Contractor must provide proof of registrations and certifications along with the list of planned installers prior to start of the work.

1.13 WARRANTIES

A. The Contractor shall warrant all materials, workmanship, and equipment against defects for a period of one year after the date of substantial completion. Certain equipment shall be warranted beginning at the time of final acceptance or for longer periods of time as specified in those sections of the Project Manual. The Contractor shall repair or replace, at no additional cost to the Owner, any item which may become defective within the warranty period. Any manufacturers warranties concerning any item installed will run to the benefit of the Owner. The Contractor agrees not to void or impair, or to allow Sub-Contractors to void or impair, any warranties regarding products or items installed as part of this project. The repair of faulty workmanship shall be considered to be included in the contract.

1.14 REFERENCE STANDARDS

A. The Contractors performance of work shall comply with applicable federal, state and local laws, rules and regulations. The Contractor shall give required notices, shall procure necessary governmental licenses, permits and inspections and shall pay without burden to the owner all fees and charges in connection therewith unless specifically provided otherwise. In the event of violation, the contractor shall pay all fines and penalties including attorney's fees and other defense costs and expenses in connection therewith.

B. Federal Communications Commission (FCC) registration or approval for any equipment requiring such approval shall be appropriately identified and obtained by the Contractor.

C. Comply with NFPA 70.

D. Design, manufacture, test and install communications cabling networks per manufacturers' requirements, state codes, local codes, requirements of authorities having jurisdiction and particularly the following standards:
   1. Comply with ANSI/TIA-568-B.1 Commercial Building Telecommunications Cabling Standard Part 1 General Requirements.
   2. Comply with ANSI/TIA-568-B.2 Commercial Building Telecommunications Cabling Standard Part 2 Balanced Twisted-Pair Cabling Components.
   3. Comply with ANSI/TIA-568-B.3 Optical Fiber Cabling Components Standard.
   4. Comply with ANSI/TIA 569-A Commercial Building Standard for Telecommunications Pathways and Spaces.
   5. Comply with ANSI/TIA 606(B) The Administration standard for the Telecommunications Infrastructure of Commercial Buildings.
   6. Comply with ANSI/TIA 607(B) Commercial Building Grounding and Bonding Requirements for Telecommunications.
   7. Comply with ANSI/TIA 526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.
   8. Comply with ANSI/TIA 526-14A Measurement of Optical Power Loss of Installed Multimode Fiber Cable Plant.
   9. Comply with ANSI/TIA/EIA-758(A) Customer-Owned Outside Plant Telecommunications Standard.
   10. TIA TSB 67 Transmission Performance Specifications for Field Testing of Twisted-Pair Cabling Systems.

E. Install cabling in accordance with the most recent addition of BICSI publications:
   1. BICSI Telecommunications Distribution Methods Manual (TDMM)
   2. BICSI Customer-Owned Outside Plant Design Manual (OSP)
   3. BICSI Electronic Safety and Security Design Reference Manual (ESSDRM)
   4. BICSI 002-2014, Data Center Design and Implementation Best Practices.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

G. Federal, state, and local rules, regulations and ordinances governing the work as fully a part of the specifications as if herein attached. Where requirements of the drawings or specifications are more stringent than the applicable codes, rules, regulations and ordinances the specifications shall apply.
   1. American Society for Testing and Materials (ASTM): ASTN E.814 - Fire Tests of Through-Penetration Firestops.
   2. Underwriters Laboratories, Inc. (UL): U.L. 1479 - Fire Tests of Through-Penetrations Firestops.
   3. National Fire Protection Association (NFPA): NFPA 70 - National Electrical Code.

4. Americans with Disabilities Accessibility Guidelines (ADA)
5. Code of Federal Regulations, Title 29, Chapter XVII, part 1910 (OSHA).
6. Uniform Building Code (UBC).
7. International Building Code (IBC).

1.15 COORDINATION

A. Coordinate and schedule all construction work with the General Contractor prior to beginning work. Do not interrupt building activities without strict coordination with the General Contractor. Unscheduled appearance to work in the spaces without prior scheduling with the General Contractor is not allowed.

B. The Contractor shall attend all meetings as required by the General Contractor.

C. Convene a meeting one week prior to commencing the work of this section.
   1. Agenda:
      a. Tour, inspect and discuss building conditions related to the structured cabling system.
      b. Review submittals both completed and yet to be completed.
      c. Review plans, specifications and proposed equipment.
      d. Review construction schedule, availability of materials, personnel, equipment and facilities needed to proceed without delay.
      e. Review required inspections and testing.
      f. Review cable routing, cable support, primary pathways and communications spaces location and environmental conditions.

D. The Contractors Project Manager must be available on-site when needed and readily available.

E. Coordinate layout and installation of voice and data communication cabling with Owner's telephone switch, telephone instrument, workstation, telecommunications and LAN equipment suppliers. Coordinate service entrance arrangement with local exchange carrier.

F. Meet jointly with the design engineers, telecommunications and LAN equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.

G. Record agreements reached in meetings and distribute to other participants.

H. Adjust arrangements and locations of distribution frames, cross-connect blocks, and patch panels in equipment rooms and telecommunications rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.

I. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.

J. Fully examine the drawings and specifications for other trades and coordinate the installation of telecommunications work with the work of the other trades. Consult and cooperate with the other trades for determining space requirements and for determining that adequate clearance is allowed with respect to his equipment, other equipment, and the building.

K. Coordinate installation of telecommunications cabling with the raceway installer. Verify raceways are installed according to current TIA standards before installing cable.

L. Environmental Conditions: Do not deliver or install cables and connecting materials to the installation location until areas are complete and dry and temporary HVAC systems are

operating and maintaining acceptable ambient temperature and humidity conditions for the remainder of the project.

M. Provide offsets and elevation changes in piping, conduit and devices as required to complete the Layout and Coordination Process. Offsets and elevation change information shall be indicated in the coordination process documentation and must be submitted for review.

N. Painted Cables and Devices:
1. Protect cabling from direct painting or over-spray and coordinate the paint and cable installation schedule with respective subcontractors. Painted cables will be replaced at contractor's expense.
2. Protect faceplates and data jacks from direct painting or over-spray. Painted cables will be replaced at contractor's expense.

1.16 STRUCTURAL COORDINATION

A. In cases where the Contractor determines that superimposed loads such as suspended or floor mounted mechanical, electrical, plumbing system or equipment exist which exceed design loads indicated on structural contract documents, Contractor shall submit load data to Design Professionals for review prior to proceeding with work.

B. Distribute the maximum load hung from any structural member for mechanical, electrical, plumbing, ductwork, piping, etc. over the member’s tributary area in a way that the design superimposed dead loads listed in structural contract documents are not exceeded. The Contractor shall coordinate the loads and provide additional support or distribution framing as required achieving the allowable load distribution.

C. Connections of systems designed by Contractor’s engineer such as, but not limited to mechanical, electrical, plumbing loads are assumed to impose vertical and/or horizontal loads on the base building structural members without generating torsion in the supporting structural members. Contractor is responsible for furnishing and installing all supplementary bracing members as required to prevent torsion on the base building structure.

PART 2 PRODUCTS

2.1 PERFORMANCE, CAPACITIES AND CHARACTERISTICS

A. See Drawings for Equipment Schedules for Equipment Performance Requirements when capacities and characteristics are not indicated in the specifications.

2.2 MATERIALS

A. Unless otherwise specified, all materials and equipment shall be new, unused, and undamaged. Materials and equipment shall be the current and standard designs of manufacturers regularly engaged in their production and shall bear the UL listing, or listing by other recognized testing laboratory when such listings are available. Materials shall be free of damage or corrosion and shall be of the best quality obtainable for the purpose intended.

B. Refer to the individual specification sections for manufacturers.

2.3 COMPLETENESS OF WORK

A. The contract documents depict low voltage systems which are intended to be complete and functioning systems. All products, labor and programming necessary to render a full and functional system to fulfill the design intent shown on the documents shall be provided by the Contractor.

B. Catalog numbers referenced throughout the drawings and specifications are intended to convey the understanding of the type and quality of the product required. Where written descriptions differ from information conveyed by a catalog number the written description shall govern. No extra charge will be allowed because a catalog number is found to be incomplete or obsolete.

2.4 MATERIALS AND EQUIPMENT FURNISHED BY OTHERS

A. Where materials and equipment are indicated as furnished by others and installed or connected under this contract, it shall be the Contractor's responsibility to verify installation details and requirements.

2.5 QUANTITY OF SPECIFIED ITEMS REQUIRED

A. Wherever in these specifications an article, device or piece of equipment is referred to in the singular number; such reference shall apply to as many such articles as are shown on the drawings or required to complete the installation.

2.6 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated “wall pipe” equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
   1. Underdeck Clamp: Claming ring with set screws.

E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.

F. PVC Pipe: ASTM D1785, Schedule 40.

G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

2.7 SEALANTS

A. Manufacturers:
   1. Sealants:
      a. Dow Corning
      b. Pecora
      c. Sonneborn
      d. Tremco

B. Silicone Sealant: Single component, air curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging type for application in vertical joints and in horizontal joints, color as selected.

C. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

D. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

E. Joint Backing: ANSI/ASTM D1056; round, closed cell, polyethylene foam rod; oversized 30% to 50% larger than joint width.

F. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

G. Firestopping Materials:
1. Subject to compliance with the requirements of Division 07 Fire and Smoke Protection, provide one of the following:
a. SpecSeal 100 Fire Stop Sealant - Specified Technologies, Inc.
b. CP-25 WB+ Fire Stop Sealant - 3M Fire Protection Products
c. Tremstop Fyre-Sil Sealant - Tremco Sealants & Coatings
d. Metacaulk
e. Dow Corning

2.8 ACCESS DOORS

A. Manufacturers:
1. Access Doors:
a. J. L. Industries
b. Karp Associates, Inc.
c. Larsons Mfg. Co.
d. Milcor, Inc.
e. Miller Limited Partnership
f. Nystrom, Inc.

B. Prime coated 14 gauge steel, flush, with screwdriver operated cam lock, frame to accommodate construction type; size as indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Wiring Method: Provide wiring in conduit, raceway and cable tray except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

B. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings.

C. Install cables using techniques, practices, and methods that are consistent with Category rating of components and that ensure Category performance of completed and linked signal paths, end to end.

D. Install cables without damaging conductors, shield, or jacket.

E. Furnish tools and test equipment. Provide all specified materials, installation hardware, and labor required to complete work shown on drawings and specified in this Section. This shall include work and miscellaneous items not specified but necessary to build a complete telecommunications installation including test equipment accessories and appurtenances required for testing the system. All systems shall be complete and ready for operation.

F. Use cable bundling hardware rated for the environment and application in which used. Applications include, but are not limited to, general purpose, outdoor, chemical resistant, flame retardant, high temperature, and vibration.

G. Provide reusable cable management straps for bundling and securing cables. Do not use nylon cable ties.

H. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer.

I. Pull cables without exceeding cable manufacturer's recommended pulling tensions.

J. Install exposed cables parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.

K. Secure and support cables at intervals not exceeding 48 inches and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

L. Wiring within Wiring Closets and Enclosures: Provide conductors of adequate length.

M. Train conductors to terminal points with no excess.

N. Separation of Wires: Comply with TIA-569-A rules for separating unshielded copper voice and data communication cabling from potential EMI sources, including electrical power lines and equipment.

O. Make splices and terminations only at indicated outlets, terminals, cross-connects, patch panels, and splices.

P. Use splice connectors compatible with media types.

3.3 FIRESTOPPING

A. Firestop all smoke and fire rated walls, partitions and openings after the installation of communications cabling in sleeves and pathways. Firestop material shall be approved for use with the communications cables and jackets being installed.

3.4 RECORD DRAWINGS

A. Maintain current documents at the construction site.

B. Record drawings shall include all information required for shop drawings and, in addition, shall indicate the following:
   1. Routing of cables between communications rooms and from communications rooms to entrance facilities.
   2. Revisions to construction documents (addenda and field changes).
   3. Record drawings shall include all construction changes posted to all portions of the documents including but not limited to communications floor plans, expanded plans, wall and rack elevations, schematics, labeling and installation details. Record documents shall include and clearly show final cable labeling designations down to the individual outlet and port.
   4. Record drawings shall be complete and organized to be suitable for use as disaster recovery and cable infrastructure administration documents.

C. Final drawing shall be provided to Engineer in electronic format.

D. Post a complete set of record documents in the MDF serving the project. In each MDF/IDF post a final floor plan of the outlets served by each IDF on the wall behind a protective plexiglass wall frame.

3.5 TRENCHING, EXCAVATION, BACKFILLING AND REPAIRS

A. Trenching, excavation, backfilling and repairs are the responsibility of the Contractor. Coordinate the extent of all work wit the General Contractor where applicable and coordinate related work with all trades. Failure to properly coordinate this effort resulting in additional trenching, excavation, backfilling or repairs shall be performed at no additional cost by the Contractor.

3.6 OBSERVATIONS

A. Specifications and drawings represent work to be done in view of the total project requirements. Final locations of all conduits, jacks, outlets, racks, components etc. to eliminate possible conflict with other trades is the responsibility of this contractor. Contractor to provide all project management and supervision required for his personnel to insure installation is made in accordance with the plans and specifications and that all codes, safety rules and regulations are observed. In the event of conflicts with other trades, this Contractor is to make every reasonable effort to resolve the conflict with other trades involved, by preparation of drawings or sketches or by other appropriate action. Only after this on-site coordination has taken place, and a resolution cannot be found, is the Contractor to request assistance. Assistance shall be requested in adherence with the RFI process defined for this project.

3.7 DEMONSTRATION

A. Participate in project site observations, walk-throughs, and punch lists as requested by the Owner or the Architect/Engineer.

B. Demonstrate completeness of work relative to completion percentages submitted for payment.

3.8 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish.

B. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION

SECTION 27 0527

GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section includes grounding of telecommunications systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.2 SUBMITTALS

A. Product Data: For the following:
   1. Ground lugs.
   2. Ground conductors.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   1. Comply with UL 467.

B. Comply with NFPA 70.

C. Comply with current TIA J-STD-607, Commercial Building (Earthing) and Bonding Requirements for Telecommunications.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ground Lugs and Connectors:
   1. Burndy.
   2. Harger.
   3. Panduit.

2.2 GROUNDING CONDUCTORS

A. For insulated conductors, comply with other Division 26 Sections.

B. Insulate with green-colored insulation on larger conductors where green insulation is not available. Use green-colored tape at each termination point or splice to identify ground conductor. One exception is the use of manufacturer-recommended ground straps to bond cable trays or racks.

2.3 CONNECTOR PRODUCTS

A. Comply with IEEE 837, UL 467, and TIA 607; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. High-Pressure Compression Connectors: Burndy Hyground System or Panduit Structured Ground System.

PART 3 - EXECUTION

3.1 APPLICATION

A. Use only copper conductors for grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

D. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches (600 mm) below grade.

3.2 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide #6 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
   1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
   2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors or high-pressure compression connectors for outdoor locations,unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

3.4 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
   1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
   2. Make connections with clean, bare metal at points of contact.
   3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
   4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
   5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

6. Clean ground bars and apply a light coating of anti-oxidant between the ground bar and ground lug.

B. Telecommunications Grounding Conductor Terminations: Provide compression lugs. For #4 AWG and larger, use two-hole lugs. For #6 AWG and smaller, use one-hole lugs.

C. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing or at a nonmetallic housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

D. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

E. High-Pressure Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

F. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.5 TELECOMMUNICATIONS GROUNDING

A. Install each bonding conductor in the most direct route possible without interfering with other systems or equipment.

B. Install exterior grounding electrode conductors with a minimum bending radius of 12 inches.

C. Install interior grounding conductors with a minimum bending radius of 8 inches.

D. Install grounding conductors in EMT conduit unless otherwise indicated. Bond each end of the conduit to the grounding conductor using an appropriate grounding bushing.

E. When present, bond the following to the Telecommunications Main Ground Bar (TMGB):
1. Metallic equipment racks.
2. Cable shields.
3. Metal raceways and cable trays for telecommunications cabling extending from the same room or space where the TMGB is located.
4. Entrance protectors.
5. Telecommunications bonding backbones (TBBs).
6. TGBs within the same space.
7. Telecommunications panelboards.

F. When present, bond the following to the nearest Telecommunications Grounding Busbar (TGB):
1. Telecommunications panelboards: ACEG, if equipment, or its enclosure.
2. TGBs within the same space.
3. Telecommunications Bonding Backbones (TBBs) located on the same floor and terminated to another TGB.
4. Metallic equipment racks.
5. Cable shields.

6. Metal raceways and cable trays for telecommunications cabling extending from the same room or space where the TGB is located.

G. Labeling:
1. Busbars:
   a. Clean all surfaces prior to attachment of any label.
   b. Follow manufacturer's recommendations for cleaning and affixing labels.
   c. Label Location: Upper right-hand corner of the busbar.
   d. Label Information: The identifier information is shown on drawings.
   e. Method: Self-adhesive, engraved plastic nameplate, black with white letters.
   f. Format: All capital letters Font shall be as large as possible to fill the label space with the information. The font shall be Helvetica, or equal, and bold. One line format. Letters shall be at least 1/2-inch tall for readability.
2. Bonding Conductors:
   a. Label Location: On the conductor at each end where it terminates.
   b. Label Information: The identifier information is shown on the drawings and conductor destination information.
   c. Method: Machine printed Brady label, part number WML-1223-292.
   d. Format: All capital letters. Font shall be as large as possible to fill the label space with the information. The font shall be Helvetica, or equal, and bold. One line format.
   e. Examples:
      1) Bonding Conductor for Telecommunications (BCT). The BCT bonds the MGW to the TMGB.
      2) Telecommunications Bonding Backbone (TBB). The TBB bonds the TMGB to the TGB. There may be multiple TBBs. See detail drawings for additional TBB labeling.
      3) Equipment Bonding Conductors: EK, followed by the sequence numbers, e.g., EK001, EK002, etc.

END OF SECTION

SECTION 27 0528

PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section includes pathways used for low voltage communications cabling.

1.2 DEFINITIONS

A. Telecommunications Pathways: A cable distribution system consisting of raceways, cable trays, racks and ladders; conduits; distribution rings and mechanical cable supporting devices.

B. Pathways shall include: surface-mounted conduits, sleeves/conduits through walls and spaces, cable trays, J-hooks, boxes, surface raceways, and conduits.

1.3 SUBMITTALS

A. Pre-Construction Submittals:
   1. Product Data: Include data on features, ratings, and performance for each component specified.
   2. Shop Drawings: Include dimensioned plan and elevation views of each individual component.
   3. Show equipment assemblies, method of field assembly, and workspace requirements.

1.4 QUALITY ASSURANCE

A. Confirm locations of cable pathways and supports during installation to identify and remedy potential cable installation conflicts before installation of cables.

B. Insure that all minimum bend radius requirements are maintained.

C. Coordinate the placement of pathway elements with other trades.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following pre-approved manufacturers:
   1. J-Hooks:
      a. B-Line Systems, Inc.
      b. Caddy.
      c. GS Metals Corporation.
   2. Surface Raceway:
      a. Hubbell.
      b. Ortronics.
      c. Panduit.
      d. Siemon.
      e. Tyton/Hellerman.
      f. Wiremold.

2.2 SYSTEM REQUIREMENTS

A. General: Coordinate the features of materials and equipment which comprise the communications pathway system so they form an integrated system.

B. Match components and interconnections for optimum future cable installation and performance.

C. UL classified for suitability as an equipment grounding conductor.

2.3 J-HOOKS

A. Manufacturers:
1. B-Line Systems, Inc.
2. Caddy.
3. GS Metals Corporation.

B. Size: 4 inch or as indicated.

C. Category 6 rated.

D. With wire spring cable retaining clips or slots for cable ties.

2.4 DROPOUTS (WATERFALLS):

A. Cable Management Tray: Provide drop-outs full above all racks and cabinets (two per rack or as indicated) and at all locations where cable bundles leave tray above wall field termination fields.

B. Cable Runway (Ladder): Provide drop-outs full above all racks and cabinets (two per rack or as indicated) and at all locations where cable bundles leave tray above wall field termination fields.

C. Primary Conduit Waterfalls: Provide conduit end waterfalls for all 2-inch and larger primary pathways where located 12 inches or more above cable trays or terminations.

D. Provide also as located on detail drawings.

2.5 SURFACE-MOUNT BOXES

A. Surface-mount boxes shall be used for mounting standard devices and shall be available in standard, deep, and extra deep versions. They shall be available in off-white, electrical ivory, and white and shall match the color of the raceway and faceplate.

B. Color: White.

2.6 SURFACE RACEWAYS

A. Surface Metal Raceway: Sheet metal channel with fitted cover, suitable for use as surface metal raceway.
1. Divider: No

B. Fittings:
1. Manufacturer s recommended fittings including bases, covers, connecting covers, raceway dividers, flexible sections, adapters, tees, elbows (including combination, flat, internal, external, inverted, 45, 90), connectors (including box, panel, offset, adjustable), internal and external couplings for joining raceway sections, clips (including divider clips, wire clips, ground clips, support clips, cover clips), fittings (including blank end fittings, entrance end fittings, tap-off fittings, take-off fittings),

bushings, a full complement of device mounting brackets and plates, and all other components to make the system work.

2. Raceway Supports: Manufacturer's recommended fastening devices.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

B. Examine all pathways for obstructions and clear prior to the installation of cabling.

C. Examine all pathways for burs and sharp edges and remove all prior to the installation of cable. All cable damaged as a result of improperly prepared pathways shall be the responsibility of the installing contractor.

3.2 J-HOOK INSTALLATION

A. Provide velcro ties around J-hooks to secure cable.

B. Strategically place J-hooks to aid in routing at corners and at changes in height.

C. If cable tray is not used as a primary pathway, use 2-inch or larger J-hooks to support cable in primary pathways. Provide a second J-hook in a tiered or back to back configuration for each J-hook installed only when the quantity of outlets served from that primary pathway exceeds 40% of the manufacturer's rated capacity.

D. J-hooks used to support cable in secondary pathways can be 1-5/8 inches or larger. Provide a second J-hook for each J-hook installed only when the quantity of outlets served from that secondary pathway exceeds 40% of the manufacturer's rated capacity.

E. Provide J-hooks as indicated on drawings and as required between discontinuous sections of cable tray.

F. Where multiple J-hooks are installed, place J-hooks back-to-back if possible; otherwise, stack J-hooks one above the other.

G. Install J-hooks at maximum of 5 foot intervals unless cable manufacturer requires different interval to maintain warranty. Unevenly space J-hooks to avoid standing waves on the cable.

H. Attach J-hooks to building structure.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install raceways securely, in a neat and workmanlike manner, as specified in NECA 1.

C. Use flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level.

D. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.

E. Wireway Supports: Provide steel channel as specified in Section 26 0529.

F. Close ends of wireway and unused conduit openings.

G. Ground and bond raceway under provisions of Section 26 0526.

H. Use expansion connectors where required.

I. Provide firestopping under provisions of Section 07 8400 to sustain ratings when passing cable tray through fire-rated elements.

END OF SECTION

SECTION 27 0553.01

IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes instructions for labeling and documentation of telecommunications infrastructure.

1.2 DEFINITIONS

A. Administration: The method for labeling, documentation and usage needed to implement moves, adds and changes to the telecommunications infrastructure.

B. Cable Labeling System: Scheme adapted for labeling cabling, pathways and components to identify them in compliance with the current TIA-606 Administration Standard for the Telecommunications Infrastructure at Commercial Buildings and owner adopted standards.

1.3 SUBMITTALS

A. Pre-Construction:
1. Product Data.
2. Cable labeling scheme.

B. Construction Record Drawings:
1. Maintain current documents at the construction site. Submit with Operation and Maintenance manuals.
2. Include all information required for shop drawings.
3. Include revisions to construction documents (addenda and field changes).
4. Cable Labeling System schedule, including electronic copy of labeling schedules as specified in Part 3 of this Section, in software and format selected by Owner.

1.4 QUALITY ASSURANCE

A. Comply with the current TIA-606 Administration Standard for the Telecommunications Infrastructure at Commercial Buildings.

B. Comply with BICSI Telecommunications Distribution Methods Manual, current edition.

PART 2 PRODUCTS

2.1 IDENTIFICATION PRODUCTS

A. Comply with the following:
1. Cable Labels: Self-adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations.
2. Label Maker: Brady I.D. Pro or approved equivalent.

PART 3 EXECUTION

3.1 IDENTIFICATION AND LABELING

A. In addition to requirements in this Article, comply with applicable requirements in Section "Electrical Identification".

B. General Label Requirements:
   1. Mechanically print and install all labels per drawing details.
   2. Format: Select font size to be readable and to fit all information required without overlap of text.
   3. Use all capital letters.
   4. Clean all surfaces prior to attachment of any label. Follow manufacturer s recommendations for cleaning and affixing labels.
   5. Coordinate room name and/or number information used in labels with final approved room signage. Final room signage may not match room tags used in construction documents.

C. Cable Labeling System: Use a unique alphanumeric designation for each cable, and label cable and jacks, connectors, and terminals to which it connects. Use logical and systematic designations for facility's architectural arrangement.
   1. Refer to detail drawings.

D. Work Area Outlet Labeling:
   1. Label each terminated work area outlet jack per drawing details.
   2. Method: Use manufacturer's white paper inserts or approved equal. Utilize commercial software to print the information on an adhesive label and affix the label to the paper insert or type the information on the strip. Do not affix labels to the clear plastic window. If label information does not legibly fit within window, then affix label above each jack.

E. Patch Panels:
   1. Label Information: See detail drawings.
   2. Method: Affix label to the lefthand side of the patch panel without covering any port numbers.

F. Outside Plant Cables:
   1. Label Location: On the jack or sheath of the cable at the ends and at every splice, case, and manhole. Place near the hardware on which the cable is terminated.
   2. Locate label in a visible and readable location.
   3. Label Information: The cable identifier is the cable number followed by the cable pair count (numeric characters), both the beginning and ending count. The cable identifier is unique to the campus. Refer to the detail drawings.
   4. Provide polyethylene non-conductive cable tags with cable numbers as shown on the plans.
   5. Install tags at all splices (on each cable that enters the splice case), terminations, cable tray to conduit transitions, in manholes (at least once on each cable as it passes through the manhole), and at other locations as directed by the Owner.
   6. Example: A03 001-0100 A03 0101-0200

G. Inside Plant Cables:
   1. Label Location: Within 12 inches inches of each termination and tap, where it is accessible in a cabinet, junction or outlet box, and elsewhere as indicated.
   2. Label Information: Refer to detail drawings.

H. Server Cabinets, Equipment Racks, Network Enclosures and Wall Cabinets:
   1. Rack Label Location: Centered at the top and bottom of the rack or cabinet in both the front and rear.
   2. Rack Label Information: Refer to detail drawings.

I. Fiber Termination Enclosure:
   1. Label Location: On the outside of the enclosure surface in the top left corner of the panel front.

2. Label Information: Refer to detail drawings.

J. Fiber Termination Enclosure Port Labels:
1. Label Location: On the inside front panel of the enclosure in the location identified by the manufacturer for the label. In most cases, the manufacturer's insert can be used for which to affix Contractor provided labels. The connector layout within each enclosure may vary. In general, the columns of fiber connectors are grouped in units of six connectors. Columns count from left to right. Termination positions within a column count from top to bottom.
2. Label Information: Refer to detail drawings.

K. Cable Labeling System Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project, in software and format selected by Owner.

L. Cable Administration Drawings: Show building floor plans with cable administration point labeling. Identify labeling convention and show labels for telecommunications spaces, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas outlets, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA-606. Furnish electronic record of all drawings, in software and format selected by Owner.,

END OF SECTION

SECTION 27 1101

COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes telecommunications infrastructure for equipment rooms, telecommunications rooms, and service entrance facilities including, but not limited to, cable, connecting devices, lightning protection, and installation for wiring systems to be used as signal pathways for voice and high-speed data transmission.

1.2 DEFINITIONS

A. Entrance Facility (EF): Enclosed architectural space housing communications cable, terminations, cross-connects and hardware. Where An EF contains sensitive electronic communications equipment it shall be environmentally tempered.

B. Equipment Room (ER): Enclosed and environmentally tempered communications electronics architectural space housing sensitive electronic communications equipment and cable, terminations, cross-connects and hardware which generally serve a building, a campus, a tenant or a service provider. Historically these spaces have been known as Main Distribution Frames (MDFs).

C. Telecommunications Room (TR): Enclosed architectural space housing telecommunications equipment, cable, terminations, cross-connects and hardware which generally serve floor areas or tenants. Where a TR contains sensitive electronic communications equipment it shall be environmentally tempered. Historically these spaces have been known as Intermediate Distribution Frames (IDFs).

D. Telecommunications Enclosure (TE): Enclosure, cabinet or case housing for telecommunications cable, terminations, cross-connects and hardware.

1.3 SUBMITTALS

A. PRE-CONSTRUCTION SUBMITTALS
   1. Product Data: Include data on features, ratings, and performance for each component specified.
   2. Cable Administration Drawings: As specified in Part 3.
   3. Product Data: Include data on features, ratings, and performance for each component specified.
   4. Construction record drawings.

1.4 QUALITY ASSURANCE

A. Environmental: Do not deliver or install equipment frames, copper and fiber cabling to the equipment room or install termination hardware until communications equipment rooms are enclosed, painted, water-tight, complete, dry and work above and in ceiling spaces is complete. Telecommunications equipment damaged (such as painted cables) as a result of premature occupancy of the communication spaces will be replaced at the expense of the contractor.

B. Coordinate layout and installation of communications equipment with Owner's Telecommunications and LAN equipment service suppliers.

C. Coordinate entrance arrangements with local exchange carriers.

D. Coordinate location of power raceways and receptacles with locations of communications equipment requiring power to operate. Coordinate with Division 26.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following pre-approved manufacturers:
   1. Telecommunications Racks:
      a. B-Line.
      b. Chatsworth.
      c. Panduit.
   2. Cable Management and Support:
      a. B-Line.
      b. Cabofil.
      c. Chatsworth Products.
      d. Erico/Caddy.
      e. Great Lakes Case and Cabinet.
      f. Panduit.
      g. Tyton.
      h. Velcro Brand.

2.2 SYSTEM REQUIREMENTS

A. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

2.3 EXPANSION CAPACITY

A. Refer to detail drawings.

2.4 TWO-POST EQUIPMENT RACKS

A. Type: Two-Post free-standing equipment rack.

B. Finish: Baked-polyester powder coat.

C. Material: Steel.

D. Designed for telecommunications terminal support and coordinated with dimensions of units to be supported.

E. Color: Black.

F. Grounding: Provide each rack with ground lug.

G. Configuration: Standard EIA 19

H. Height: 84 inches (45U)

I. Equipment Rails: Tapped.

2.5 VERTICAL CABLE MANAGEMENT.

A. Include components that aid in routing, managing, and organizing cable to and from equipment, protect network equipment by controlling cable bend radius and providing cable strain relief and a universal design.
   1. Configuration: Front and Rear

2. Width: 8-inch
3. Cover: Hinged
4. Quantity: Two per rack

2.6 HORIZONTAL CABLE MANAGEMENT:

A. Include components that aid in routing, managing, and organizing cable to and from equipment, protect network equipment by controlling cable bend radius and providing cable strain relief and a universal design.
1. Configuration: Front and Rear
2. Height: 1U
3. Nominal Depth: Front and Rear: 8-inch
4. Covers: Hinged
5. Quantity: As indicated on the detail drawings.
6. Provide removable wire retainers to retain the cables during cover removal and #12-24 English mounting screws.
7. Provide an integral strain relief bracket on either side of the duct to allow for easy cover placement.

2.7 **WALL-MOUNT CABINET**

A. Type: Wall-mountable enclosed cabinet.

B. Finish: Baked-polyester power coat.

C. Material: Steel

D. Color: Black

E. Load Capacity: 200 lbs

F. Grounding: Provide each cabinet with ground lug.

G. Configuration: Standard EIA 19-inch

H. Usable Dimensions:
1. Height: 18U
2. Width: EIA 19-inch
3. Depth: 22 inches

I. Panels and Doors:
1. Side Panels: Sides with ventilation perforations
2. Front Door: Perforated
3. Hinge: Cabinet is hinged to allow rear access.

J. Knock-outs:
1. Top: (2) 3/4 inch and (4) 3 inch

K. Equipment Rails:
1. Front.
2. Tapped (threaded).
3. Adjustable depth.
4. Complies with EIA-310-E.

L. Accessories:
1. Vertical Cable Manager: Cable guides which align with each rack unit space in cabinet mountable in rear of cabinet.
2. Cable Brush Grommets: Cable grommets which seal cable openings in top panel.

2.8 RACK-MOUNT POWER DISTRIBUTION

A. UPS #1:
   1. Provide and configure rack mount UPS.
   2. Output:
      a. Volt Ampacity: 3000 VA
      b. Watt Capacity: 2400 Watts
      c. Nominal Voltage: 120 V
      d. Receptacles: (4) 5-15R, (4)5-20R, and (1) L5-30R
   3. Input:
      a. Input Connection: L5-30P
      b. UPS Cord Length: 10ft
   4. Accessories:
      a. Rack-mount installation kit.
      b. Network Management card, software and configuration.
      c. Warranty.

B. UPS #2:
   1. Provide and configure rack mount UPS.
   2. Output:
      a. Volt Ampacity: 750 VA
      b. Watt Capacity: 600 Watts
      c. Nominal Voltage: 120 V
      d. Receptacles: (6) 5-15R
   3. Input:
      a. Input Connection: 5-15P
      b. UPS Cord Length: 10ft
   4. Accessories:
      a. Rack-mount installation kit.
      b. Network Management card, software and configuration.
      c. Warranty.

2.9 CABLE MANAGEMENT

A. Raceways and Boxes: Comply with Division 26 Section "Raceways and Boxes."

B. Cable Bundling Hardware:
   1. Reusable Velcro cable ties.
   2. Plenum rated.

C. Cable Straps:
   1. Reusable, adjustable and capable of withstanding fastening to wall with screws or equipped with snap-and-button fasteners.
   2. Provide with or without cinch ring as applicable.
   3. Color: Black.

2.10 PLYWOOD BACKBOARDS

A. Provide void free 3/4" A/C plywood from 8" AFF to 8'-8" AFF with the A grade side of the plywood facing the inside of the room and fastened to the wall-framing members. Paint plywood with two coats of fire retardant paint. Coordinate painting of walls around plywood and ceiling, before installation of telecommunications equipment
   1. Fire Retardant Paint: A premium quality intumescent fire-retardant paint; white in color.
      a. Manufacturers:

1) Benjamin Moore & Co.; Iron Clad Retardo Latex Fire Retardant Paint 220.
2) Pittsburgh Paints; Speedhide Interior Fire Retardant Flat Latex.

B. Refer to Telecommunications plans and specifications for locations and placement of plywood backboards.

C. Refer to architectural plans and specifications where applicable.

2.11 PATHWAYS

A. General Requirements:
1. Comply with TIA-569-A and Division 26
2. Comply with Section 27 0528 Pathways for Communications Systems

B. Locate, coordinate placement and Install sleeves, conduits and cable trays, cable ladders, D-rings and associated appurtenances in accordance with the detail drawings.

C. Provide and install all cable trays or ladder racks in accordance with the detail drawings. When installed above racks leave 12" between the racks and tray and provide cable drop-outs for cable entrance to racks. Secure tray to racks.

D. All pathways shall be free of sharp edges and shall be physically and electrically continuous. Utilize manufactured radius bends, tee's and corners or utilize approved manufacturers methods for field fabrication of corners, bends, offsets and tee's. Cable trays installed at variance with manufacturers published standards or the detail drawings will be removed and reinstalled at the contractors expense.

PART 3 EXECUTION

3.1 ENTRANCE FACILITIES

A. Unlisted OSP cables entering buildings shall adhere to NEC Articles 770, 800, 820, 830 and 840 (or their successors') requirements for conduit if these cables extend beyond 50 feet from their point of entrance.

3.2 EQUIPMENT RACKS AND CABINETS

A. Provide equipment racks as indicated on drawings.

B. Bolt freestanding equipment racks to the floor. Securely fasten hinged wall brackets to the wall on which they are mounted.

C. Provide horizontal cable management above and below each patch panel unless indicated on detail drawings.

D. Provide vertical cable management on each side of each equipment rack.

E. Bag and leave attached to the rack all spare hardware.

3.3 GROUNDING

A. Comply with Section 27 0527 "Grounding and Bonding for Communications Systems"

B. Ground all equipment per ANSI-J-STD-607-A.

C. Refer to detail drawings.

3.4 INSTALLATION IN EQUIPMENT ROOMS

A. Prepare Equipment Rooms with respect to power, entry pathways, cable management trays, sleeves, conduits, backboards and hardware.

B. Provide A/C fire-rated plywood backboards, with the A-side facing out, on walls of equipment rooms and telecommunications rooms per detail drawings. Anchor (screw) plywood 18" on center continuousand within 4" of edge and corners with galvanized or stainless steel anchors.

C. Mount terminal strips and other connecting hardware on backboards, unless otherwise indicated.

D. Mount patch panels on equipment racks or cabinets. See detail drawings.

E. Group connecting hardware for cables into separate logical fields.

F. Use patch panels and termination blocks to terminate cables entering the space, unless otherwise indicated.

G. Plastic or metal ties shall not be used in the Equipment Rooms (except for armored cables). Velcro ties shall be used.

H. Service Loops shall be secured to cable tray, ladder rack or plywood with appropriate straps and/or D-ring hardware

I. Install power strips in equipment racks.

J. Refer to detail drawings.

END OF SECTION

SECTION 27 1323

COMMUNICATIONS OPTICAL BACKBONE CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes cable and installation for optical backbone communications cable systems to be used for high-speed data transmission.

B. Optical backbone cabling to includes the installation of fiber optic cable, connectors, supports, termination shelves, termination shelf hardware, station patch cords, cable termination, testing, and cutover for a complete system.

1.2 DEFINITIONS

A. Backbone Cabling: Cable or conductors between telecommunications spaces, or floor distribution terminals, entrance facilities, and the telecommunications spaces within or between buildings.

1.3 SUBMITTALS

A. Pre-Construction Submittals:
   1. Product Data: Include data on features, ratings, and performance for each component specified.
   2. Product Certificates: For each type of cable, connector, and terminal equipment, signed by product manufacturer.
   3. Cable Administration Drawings: As specified in Section 27 0501.

B. Post-Construction Submittals:
   1. Construction Record Drawings.
   2. Field quality control test reports.
   3. Documentation of the test equipment, equipment certification and calibration of test equipment utilized.

1.4 QUALITY ASSURANCE

A. Comply with Section 27 0501 "Common Work Results for Communications".

B. Comply with Section 27 0553.01 "Identification for Communications Systems".

C. Comply with TIA-568-B.1 Commercial Building Telecommunications Cabling Standard Part 1 General Requirements.

D. Comply with TIA-568-B.3 Optical Fiber Cabling Components Standard.

E. Comply with TIA 526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.

F. Comply with TIA 526-14A Measurement of Optical Power Loss of Installed Multimode Fiber Cable Plant.

G. Comply with BICSI Telecommunications Distribution Methods Manual, current edition.

H. The Contractor shall be responsible for verifying that all conduits and raceways are ready for cable placement

1.5 PROJECT CONDITIONS

A. Coordinate with pathway installer to ensure that TIA installation tolerances are maintained.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following pre-approved manufacturers:
   1. Fiber Optic Cable:
      a. Berk-Tek.
      b. CommScope.
      c. Corning Cable Systems.
      d. General Cable Corporation.
      e. Systimax Connectivity Solutions.
   2. Fiber Termination Equipment:
      a. Corning Cable Systems.
      b. Ortronics.
      c. Panduit Corp.
      d. Systimax Connectivity Solutions.
   3. Fiber Optic Splice Equipment:
      a. Corning Cable Systems.
      b. Raychem.
      c. Systimax Connectivity Solutions.
      d. 3M.
   4. Innerduct:
      a. Maxcell Fabric Innerduct.

2.2 SYSTEM REQUIREMENTS

A. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

B. Expansion Capability: Unless otherwise indicated on the detail drawings, provide spare positions in fiber shelves and enclosures to accommodate 20 percent future increase in active backbone cabling.

C. The Information Transport System backbone cabling shall conform to the requirement of TIA-568-B in conformance with this standard, the standard shall be designed in a hierarchical star topology.

D. Backbone cabling shall provide interconnections between telecommunications spaces, data center facilities, server rooms, and building-to-building facilities in the telecommunications cabling infrastructure. Backbone cabling system to consist of all cables, intermediate and main cross-connects, mechanical terminations, patch cords and/or jumpers used for backbone-to-backbone cross-connection.

2.3 MATERIALS

A. General:
   1. Provide Metallic Armored, Plenum Rated OM4 multimode for runs between telecommunications spaces.

B. Optical Fiber Cables:

1. Optical fiber cables shall meet or exceed all applicable national and local building fire code requirements. Fiber cables used in a return air plenum environment shall have Underwriters Laboratories rating that meets or exceeds the requirements of NFPA 262-1985 and UL®-910. (OFNP) and (UL®) shall be printed every two (2) feet on the cable jacket. The optical fiber riser cable shall have an Underwriters Laboratories rating that meets or exceeds the requirements of UL®-1666 (OFNR) and (UL®) shall be printed every two (2) feet on the cable jacket.
2. Cables: Factory fabricated, tight buffered, jacketed, low loss, glass type, fiber optic cables, 125 micron cladding diameter.
3. Backbone, Strands per Cable: As indicated on the Drawings.
4. Cable Jacket: Rated and UL Listed for use in plenums (OFNP). .
5. Operating Temperature Range: Minus 20 to plus 70 degrees C.
6. Cable Types:
    a. OM4 Multimode Optical Fiber Cabling:
        1) 50/125 micron
        2) Maximum Attenuation: 3 dB/km at 850 nm; 1 dB/km at 1300 nm
        3) Minimum Modal Bandwidth (OFL): 3500 MHz*km at 850 nm; 500 MHz*km at 1300 nm.
        4) Effective Modal Bandwidth: 4700MHz*km
        5) Color: Aqua
        6) Jacket shall be Plenum Rated, Metallic Armored.
        7) The optical fiber must conform to all relevant TIA standards.
    b. Powered Fiber Hybrid Cable
        1) 50/125 micron, OM3 multimode fiber optic cabling.
        2) Strands: 4 strands.
        3) Two AWG conductors for power.
            a) Conductors shall be sized according to final distance of security camera.
        4) Jacket shall easily split into separate sections for easy and clean termination.
        5) Match polarization according for full operation.
        6) Jacket: outdoor rated.

C. Patch Cords:.
1. Type: Dual fiber cables.
2. Terminations: Two duplex connectors arranged to mate with patch panel connectors, one at each end of each fiber cord.
3. Provide one patch cord for each fiber optic panel port/connector. Patch cords shall be outdoor rated for exterior mount devices.
4. Final quantities of each length to be determined prior to ordering and coordinated with Owner. A closet fiber optic patch cord patched into any given fiber panel port/connector shall be long enough to reach from the fiber panel port/connector to equipment port of furthest rack mounted equipment within closet routed through cable management unless otherwise noted.

2.4 FIBER-OPTIC CONNECTORS AND TERMINATION EQUIPMENT

A. Cable Connectors: Duplex LC connectors with self-centering, axial alignment mechanisms. Insertion loss not more than 0.7 dB.

B. Fiber Termination Shelf: Modular panels housing multiple-numbered cable connectors.
1. Permanent Connection: Permanently connect one end of each connector module to installed cable fiber.

2. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to satisfy specified expansion criteria.
3. Mounting: Rack.

C. Patch Cords: Dual fiber cables in 48-inch lengths.
1. Terminations: Two duplex connectors arranged to mate with patch-panel connectors, one at each end of each fiber in cord.

D. Fiber Optic Splice Case:
1. Type: Indoor.
2. Designed for the number of cables, size of cables, quantity of strands, and environment of the splice location.
3. Able to be positioned either horizontally or vertically, other than aerial.
4. Closures affect a complete splice closure system and include the manufacturer s recommended hardware and parts for the splice type and environment including, but not limited to, end caps or covers, splice wrappers, flange seals, bond connectors and clamps, ground braids, alignment bars, lubricants, cover clips, external bond braids or ribbons, and cleaning kits.
5. Fiber Optic Splice Type: Fusion.

E. Fiber Optic Splice:
1. Type: Fusion.
2. Provide physical protection for splices.

2.5 OPTICAL FIBER INNERDUCT

A. UL Listed, fabric mesh, specifically designed for optical fiber cable pathways.

B. Plenum rated.

C. (2) 3" cell innerduct.

D. Pulling Strength: Minimum of 600 pounds.

E. Color: White.

F. Fittings and Innerduct Bodies: Utilize manufacturer s recommended fittings including couplings, adapters, end caps, end bells, expansion couplings, plugs, sleeves, a full complement of connective devices, and all other components to make a complete innerduct system suitable for its intended purpose.

G. Innerduct shall have a pre-installed pull string with a minimum 600 pound pulling strength.

H. Provide innerduct for exterior fiber optic cabling only.

2.6 ARMORED OPTICAL FIBER ACCESSORIES

A. Grounding Kit: Provide armored cable grounding kit for each end of cable.

B. Armor Connector: Provide manufacturer's recommended MC cable connector for termination of armor at enclosure.

PART 3 EXECUTION

3.1 APPLICATION

A. Optical Backbone Cable:
1. Refer to detail drawings for additional optical fiber requirements.

3.2 INSTALLATION

A. Backbone Cables:

1. Install cables in trays or as indicated on drawings. Where non-armored cables are installed in conduit pathways they shall be installed in innerduct. Install optical fiber cable after installation of the innerduct.
2. Provide supports as required for vertical cable runs. Provide three supports per floor and a service loop or offset every three floors to allow for proper strain relief.
3. Where riser cables serving multiple telecommunications spaces pass through the same conduit sleeve or are mounted on the same backboard, separately bundle the cables serving each closet using commercially available velcro wire ties.
4. Provide continuous optical fiber cable between telecommunications spaces. Do not splice cables.
5. Do not install bruised , kinked, scored, deformed or abraded cable. Remove and discard cable if damaged during installation and replace it with new cable.
6. Cold Weather Installation: Bring cable to room temperature before de-reeling. Heat lamps shall not be used for heating.
7. Comply with BICSI TDMM and manufacturers' specifications for pulling cable. Monitor cable pulling tensions.
8. Use common (aligned) vertical sleeves for all vertical copper and fiber cables.
9. Make terminations only at indicated outlets, terminals, cross-connects and patch panels.
10. All backbone cabling cross-connects shall be located in telecommunications spaces.
11. Splices or other unapproved hardware and facilities not specifically indicated on the detail drawings shall not be used as a part of the backbone cabling.
12. All optical cables shall be free of surface imperfections and inclusions to meet the optical, mechanical and environmental requirements of this specification.
13. Connections between fiber optic patch panels shall be made with a premanufactured fiber optic patch cord. All fiber optic jumper assemblies shall comply with the standards for both fiber optic cables and fiber optic connectors.
14. Install cable in accordance with the manufacturer's specifications for installation and loading. Do not violate the short and long term cable loading.
15. Armored fiber metallic sheathing shall extend from fiber enclosure to fiber enclosure. Terminate armor with armor connector using available enclosure knock-out.
16. Ground armored fiber armor with grounding kit or MC connector suitable with manufacturer's recommendations.
17. Do not violate the manufacturer's minimum bending radius for both loaded and unloaded conditions. Avoid cable wrinkling.
18. Replace damaged optical fiber cable with new material.
19. Provide a service loop of 20 feet at each end of each cable. Place the location of the service loop such that the cable can be extended without interference of other systems such as mechanical systems, electrical piping, plumbing, racking, etc. Wind the loop such that the cable enters the rack and distribution hardware with minimal bends. Store the loop out-of-way and fasten to the wall or ceiling to prevent possible damage. See detail drawings.

3.3 INNERDUCT INSTALLATION

A. Provide innerduct for each fiber optic backbone cable.

B. Install innerduct prior to installation of the optical fiber cable. Coordinate innerduct routing path through the pathway system and receive Owner approval before innerduct is installed.

C. Provide innerduct for the entire length of the cable from termination enclosure to termination enclosure. Provide a mechanically continuous system connected to all boxes, device mounting brackets, and cabinets.

D. Cut squarely, using a saw or pipe cutter; de-burr cut ends.

E. Draw innerduct tight to the shoulder of fittings and couplings and fasten securely.

F. Utilize innerduct manufacturer's end caps to protect installed innerduct against entrance of dirt and moisture before and after installation of the cable.

G. Do not exceed manufacturer's recommended installation tension.

H. Replace damaged innerduct with new material.

3.4 GENERAL OPTICAL FIBER TERMINATION

A. Directly terminate all fiber optic cable with LC composite/ceramic connectors.

B. Use manufacturer-furnished nylon cable wrap to bundle pigtails.

C. Terminate, install, protect cable and fiber according to the connector manufacturer s recommended practices. Use the manufacturer s kits, processes, cleaners, solvents, fasteners, and other mechanisms necessary for a complete termination unless otherwise indicated herein.

D. Unless otherwise indicated, route, manage, prepare, protect, install, and store cable according to the hardware manufacturer s recommended practices. Use the manufacturer s kits, processes, cable and fiber management hardware, fasteners, and other mechanisms necessary for a complete installation.

E. Use manufacturer-recommended breakout kit to prepare all outside plant cable for termination.

F. Incorporate industry standard color coding and positioning within the enclosures.

3.5 FIBER TERMINATION ADAPTER ORIENTATION

A. Specific orientation of the adapters is necessary to maintain the correct polarity of the transmit and receive signals throughout the building. Polarity is achieved by physical key slot orientation of adapters in the fiber distribution enclosures.

B. The required adapter orientation is included with the fiber cable recording documents from the Owner. Coordinate the key-slot-up or key-slotdown orientation as it relates to the A/B and B/A designation with the Owner. See orientation drawings.

C. Achieve physical orientation of the adapters by rotating the connector panel in the enclosure to the proper key-slot-down orientation.

D. Achieve the proper physical orientation of the adapters by removing and rotating the adapter within the connector panel to the proper key-slot-up or key-slot-down orientation.

E. Install fiber optic adapters in a reverse-pair position polarity with key-slot-up orientation for duplex adapters unless owner standards or existing infrastructure utilizes another polarity. If fiber optic patch cords are provided ensure patch cords are A/B position patch cords.

3.6 GROUNDING

A. Comply with Section 26 0526 "Grounding and Bonding for Electrical Systems."

B. Comply with Section 27 0527 "Grounding and Bonding for Communications Systems."

3.7 PERFORMANCE TESTING

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA-568-B.1 when tested according to test procedures of this standard.

B. Perform Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.

C. Provide certification reports printed on 8-1/2 inch x 11 inch sheets. Provide one or more three-ring binders as required to contain reports. Provide a separate tab for each group of cables served from a common telecommunications space. Provide an additional tab for backbone cables. Present cable testing results in a sequenced or otherwise orderly matrix format.

D. General Requirements:
   1. Test every fiber optic cabling link in the installation in accordance with the field test specifications defined by the Telecommunications Industry Association (TIA standard TIA-568-B (or by the appropriate network application standard(s)) whichever is more demanding. See paragraph “Performance Test Parameters” in this Section.
   2. TIA-568-B defines the passive cabling network to include cable, connectors, and splices (if present) between two optical fiber patch panels (connecting hardware). A typical horizontal link segment is from the telecommunications outlet/connector to the horizontal cross-connect. This TIA document describes three typical backbone link segments: (1) main cross-connect to intermediate cross-connect, (2) main cross-connect to horizontal cross-connect, or (3) intermediate cross-connect to horizontal cross-connect. The test must include the representative connector performance at the connecting hardware associated with the mating of patch cords. The test does not, however, include the performance of the connector at the interface with the test equipment.
   3. Test 100 percent of the installed cabling links. The cable must pass the requirements of the standards mentioned above and as further detailed below. Any failing link must be diagnosed and corrected. Follow the corrective action with a new test to prove that the corrected link meets the performance requirements. Provide the final and passing result of the tests for all links in the test results documentation in accordance with this Section.
   4. Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. These certificates shall have been issued by any of the following organizations or an equivalent organization:
      a. The manufacturer of the fiber optic cable and/or the fiber optic connectors.
      b. The manufacturer of the test equipment used for the field certification.
      c. Training organizations authorized by BICSI (Building Industry Consulting Services International with headquarters in Tampa, Florida) or by the ACP (Association of Cabling Professionals Cabling Business Institute located in Dallas, Texas).
   5. Field test instruments for multimode fiber cabling must meet the requirements of TIA-526-14A. The light source must meet the launch requirements of TIA-455-50B, Method A. Achieve this launch condition either within the field test equipment or by use of an external mandrel wrap (as described in Clause 11 of TIA-568-B.1) with a Category 1 light source.
      a. Field test instruments for singlemode fiber cabling must meet the requirements of TIA-526-7.

6. Calibrate the tester within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
7. The fiber optic launch cables and adapters must be of high quality. The launch cables must not show excessive wear resulting from repetitive coiling and storing of the tester interface adapters.
8. The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests.
9. A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter.
10. Reterminate and retest cables which fail performance testing.
11. Replace cables which fail the second test.

E. Performance Test Parameters:
1. TIA Standard 568-B prescribes that the single performance parameter for field testing of fiber optic links is link attenuation (alternative and equivalent term: insertion loss), when installing components compliant with this standard.
2. Calculate the link attenuation by the following formulas specified in TIA Standard 568-B:
   a. Link Attenuation = Cable Attn + Connector Attn + Splice Attn.
   b. Cable Attn (dB) = Attenuation Coefficient (dB/km) * Length (km).
   c. The values for the Attenuation Coefficient are listed below:

Optical Fiber Type	**Wavelength (nm)**	**Attenuation Coefficient (dB/km)**
Multimode 62.5/125 um	850	3.5
	1300	1.5
Multimode 50/125 um	850	3.5
	1300	1.5
Single-mode (Inside Plant)	1310	1.5
	1550	1.0
Single-mode (Outside Plant)	1310	0.5
	1550	0.5

1. Connector Attn (dB) = number of connector pairs * connector loss (dB).
2. Maximum allowable connector loss = 0.75 dB.
3. Splice Attn (dB) = number of splices (S) * splice loss (dB).
   a. Maximum allowable splice loss = 0.3 dB.
4. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices; i.e., link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.
5. Test equipment that measures the link length and automatically calculates the link loss based on the above formulas is preferred.

F. The above link test limits attenuation are based on the use of the One Reference Jumper Method specified by TIA-526-14A, Method B, and TIA-526-7, Method A.1. Follow the procedures established by these standards or application notes to accurately conduct performance testing.

G. Each fiber optical link terminated with an optical adapter system that does not impose a transmission direction because the adapters are not or cannot be ganged and must be tested and documented in both directions since the direction of the signal transmission cannot be predicted at the time of installation.

H. Approved Test Equipment Manufacturers
1. Fiber Optic Test Equipment
   a. Agilent Technologies

b. Corning Cable Systems
c. Fluke
d. Ideal Industries

I. Test Result Documentation:
1. Record the test result information for each link in the memory of the field tester upon completion of the test.
2. Transfer the test result records saved by the tester into a Windows-based database utility that allows for the maintenance, inspection, and archiving of these test records. Guarantee these results are transferred to the PC unaltered; i.e., "as saved in the tester" at the end of each test.
   a. The popular "csv" format (comma separated value format) does not provide adequate protection and will not be acceptable.
3. Store and deliver the database for the completed job, including twisted-pair copper cabling links if applicable, on CD-ROM. Include the software tools required to view, inspect, and print any selection of test reports.
4. Provide a paper copy of the test results that lists all the links that have been tested with the following summary information:
   a. The identification of the link in accordance with the naming convention defined in the overall system documentation.
   b. The overall Pass/Fail evaluation of the link-under-test including the attenuation worst case margin (margin is defined as the difference between the measured value and the test limit value).
   c. The date and time the test results were saved in the memory of the tester.
5. General information to be provided in the electronic database containing the test result information for each link:
   a. The identification of the customer site as specified by the end-user.
   b. The overall Pass/Fail evaluation of the link-under-test.
   c. The name of the standard selected to execute the stored test results.
   d. The cable type and the value of the "index of refraction" used for length calculations.
   e. The date and time the rest results were saved in the memory of the tester.
   f. The brand name, model and serial number of the tester.
   g. The revision of the tester software and the revision of the test standards database in the tester.
   h. The detailed test results data to be provided in the electronic database for each tested optical fiber must contain the following information:
      1) The identification of the link/fiber in accordance with the naming convention defined in the overall system documentation.
      2) The insertion loss (attenuation) measured at each wavelength, the test limit calculated for the corresponding wavelength, and the margin (difference between the measured attenuation and the test limit value).
      3) Report the link length for each optical fiber for which the test limit was calculated based on the formulas.
   i. Cable type value of NPV used for length calculations. Follow BICSI guidelines for checking the NPV of the cable being used.

END OF SECTION

SECTION 27 1513

COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes wire, cable, connecting devices, installation, and testing for wiring systems to be used as signal transmission media for voice and high-speed data transmission.

B. The horizontal cabling includes the installation of jacks, face plates, copper station cable, distribution frame hardware, cross-connect hardware, station patch cords, cable termination, testing, and cutover.

1.2 DEFINITIONS

A. Horizontal Cable: Cable that runs from the telecommunications space to a device location. It may be installed in either a horizontal or vertical plane.

1.3 SUBMITTALS

A. Preconstruction Submittals:
   1. Product Data: Include data on features, ratings, and performance for each cable, component, termination methods and testing criteria for each component specified.
   2. Wiring diagrams. Show typical wiring schematics including the following:
      a. Workstation outlets, jacks, and jack assemblies.
      b. Patch cords.
      c. Patch panels.
   3. Product Performance Certificates: For each type of cable, connector, and terminal equipment,
      a. Signed by product manufacturer.

B. Post-Construction Submittals:
   1. Construction Record Drawings.
   2. Field quality control test reports.
   3. Documentation of the test equipment, equipment certification and calibration of test equipment utilized.

1.4 QUALITY ASSURANCE

A. Comply with Section 27 0501 "Common Work Results for Communications".

B. Comply with Section 27 0553.01 "Identification for Communications Systems".

C. Comply with TIA-568-B.1 Commercial Building Telecommunications Cabling Standard Part 1 General Requirements.

D. Comply with TIA-568-B.2 Commercial Building Telecommunications Cabling Standard Part 2 Balanced Twisted-Pair Cabling Components.

E. Comply with TIA TSB 67 Transmission Performance Specifications for Field Testing of Twisted-Pair Cabling Systems.

F. Comply with BICSI Telecommunications Distribution Methods Manual, current edition.

G. The Contractor shall be responsible for verifying that all conduits and raceways are ready for cable placement

1.5 PROJECT CONDITIONS

A. Coordinate with pathway installer to ensure that TIA distance limits and installation tolerances are maintained. Outlets that are beyond TIA distance shall be brought to the Owner/Engineer s attention as soon as possible. Owner/Engineer shall not be responsible for outlets beyond distance limits as a result of deviation from the plans and/or incorrectly routed sleeves and pathways.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following pre-approved manufacturers:
   1. Copper Horizontal Cable:
      a. Berk-Tek.
      b. CommScope.
      c. General Cable Corporation.
      d. Systimax Connectivity Solutions
      e. Superior Essex
   2. Copper Termination Equipment:
      a. CommScope.
      b. Ortronics.
      c. Panduit Corp.
      d. Systimax Connectivity Solutions.

2.2 SYSTEM REQUIREMENTS

A. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

B. Expansion Capability: Unless otherwise indicated on the detail drawings, provide spare positions in cross-connect and patch panels, and terminal strips to accommodate 20 percent future increase in active workstations.

C. Source Limitations: Obtain all structured wiring products twisted-pair through one source from a single manufacturer.

D. The Information Transport System backbone cabling shall conform to the requirement of TIA-568-B. in conformance with this standard, the standard shall be designed in a hierarchical star topology.

E. Horizontal cabling shall provide interconnections between telecommunications spaces and work area outlets. The horizontal cabling system to consist of all cables, intermediate and main cross-connects, mechanical terminations, patch cords and/or jumpers used for termination or cross-connection.

F. Horizontal cable shall be installed in a star topology. Each work area outlet shall be cabled directly to telecommunications space serving the area.

G. All horizontal cabling terminations shall be located in telecommunications spaces. Bridged taps, splitters or other unapproved hardware and facilities not specifically indicated on the detail drawings shall not be used as a part of the backbone cabling.

H. Multi User Telecommunications Outlet Assemblies (MUTOA) are not allowed unless otherwise specifically detailed in the construction documents.

I. Consolidation Points and intermediate cross-connects are not allowed unless otherwise specifically detailed in the construction documents.

J. All cables placed in conduits and cable trays shall not exceed the fill capacities as listed in TIA-569 even though maximum fill quantities as listed in ANSI/NFPA 70 are less strict.

K. Upon entering the telecommunications space the cabling shall be neatly combed and separated according to service application. All added cables shall consistently follow the same path. Separate system cabling by pathway sleeve where possible.

L. All cabling shall be new and unused, provided, installed, terminated and tested to perform a complete system. Installers shall not deviate from the specified structured cabling system components and any substitutions not approved via the formal substitution process will be rejected and removed and replaced with the approved products at the Contractor's expense.

M. CCTV, IP Device, and Television Data Cables:
1. Provide horizontal data cabling to each device outlet location where indicated on the drawings.
2. Cables and jacks for these devices shall maintain the same coloring scheme as normal work area outlets.
3. Cables will be terminated, tested and warranted utilizing the same criteria as the work area outlet horizontal cabling system.

2.3 MATERIALS

A. Twisted-pair Cables:
1. Cables: Listed as complying with the TIA-568-B Categories listed below.
2. Conductors: Solid copper.
3. UTP CMP (Plenum Rated) Cable: Listed for use in air-handling spaces. Features are as specified for cables, conductors, and UTP cable, except materials are modified as required for listing.
4. Category 6:
   a. Type: Unshielded Twisted Pair (UTP), UL Listed, Category 6
   b. Conductors: 23 AWG, copper
   c. Quantity of Pairs: 4
   d. Jacket Color: blue

B. Twisted-pair Terminal Equipment:
1. UTP Cable Connecting Hardware:
   a. Patch Panels: Modular panels housing multiple-numbered jack units with IDC type connectors at each jack for permanent termination of pair groups of installed cables.
      1) Configuration: Flat.
         a) Mounting: TIA 19-inch rack mounting.
         b) TIA Category 6
         c) Front Connections: Modular jacks
         d) Rear Connections: Modular
         e) Port Color: Match cabling color
         f) Wiring Scheme: T568B
         g) Ports: 24
         h) Capacity: Number of Jacks per Field: One for each four-pair UTP cable.

2.4 PATCH CORDS

A. Provide one 5' workstation patch cord for each outlet assembly.

B. Provide one 3' closet patch cord for each outlet assembly.

C. Final quantities of each length to be determined prior to ordering.

D. Provide patch cord which complies with manufacturer's warranty.

PART 3 EXECUTION

3.1 APPLICATION

A. Horizontal Cable: Use cable identified above for runs between telecommunications spaces and work area outlets for voice and data service.

3.2 INSTALLATION

A. Provide quantity of horizontal cables as indicated on the floor drawings and detail drawings. Install cables continuous from the jack on the communication outlet faceplate to the termination frame serving the area.

B. Splicing of horizontal cables is not allowed.

C. Intermediate cross-connect or other termination of horizontal cables is not allowed unless specifically detailed and specified otherwise.

D. Terminate cables in accordance with TIA-568-B Commercial Building Telecommunications Wiring Standard, observing the industry standards for terminating the various types of color coded cables within a building.

E. Route cables in a direct path between the termination points. Neatly arrange cables in cable trays and in communication closets. Provide D rings spaced a maximum of 12 inches on center to support cables run on the face of any plywood wall.

F. Install cables in cable trays, pathways and sleeves provided.

G. Velcro ties shall be used where appropriate or where specifically indicated in the contract document details. Where required ties shall be spaced at 5 feet to 6 feet in cable tray.

H. Where cables must be installed between device and primary pathways, continuously support all cables from building structure in such a manner that the cable will not be damaged by normal building use.

I. Run all cabling parallel and perpendicular to building structural elements unless specifically noted otherwise noted or as necessary where end-to-end lengths would otherwise exceed 290 feet.

J. Provide strain relief for the cables above suspended ceilings, and where any continuous cable support system is interrupted, using mechanical fasteners such as necessary to maintain cable Category rating of J-hooks and other necessary devices to support cables from the structure or ceiling support. Do not use suspended ceiling support wires or ceiling grid to support telecommunications cabling. Space cable supports 4-5 feet apart. Where cable runs exceed 100 feet, and metallic J-hook supports are utilized, place supports at differential intervals. Even spacing of metallic J-hooks for runs exceeding 100 feet are not permitted.

K. In suspended ceiling and raised floor areas where duct, cable trays, or conduit are not available, bundle station wiring in groups of 50 or less. Secure with Velcro cable ties snug but not deforming the cable geometry. Support cable bundles via J-hooks attached to the building structure and framework at a maximum of 4-foot intervals.

L. Do not attach to or support cable by fire sprinkler heads or delivery systems or any environmental sensor located in the ceiling air space.

M. Plan cable installation and cable routes such that the capacity of the conduit and cable tray is used most efficiently. Fill conduits and sleeves to maximize capacity and to minimize cross-over of future cable installations.

3.3 HORIZONTAL CABLES

A. Provide horizontal cables from each outlet to the nearest telecommunications space as indicated on the drawings.

B. Route cables from outlets to communication closets so that the maximum cable length is 295 ft. (90 m) is maintained. Install cables parallel or perpendicular to the building structure.

C. Allow adequate slack for cable termination.
1. Wall outlets: 12 inches.
2. Systems furniture: as necessary to reach the farthest point on each desktop using the furniture raceways plus 12 inches at the jack location.
3. Telecommunications Spaces: as necessary to reach the most distant patch panel or punch-down block plus a length equal to 2 times the room height.

D. Neatly arrange cables in cable trays and in telecommunications spaces.

E. For areas and locations that are close to TIA distance limits, run a length test on proposed routing to said area or location. Inform Owner and Engineer of any jacks beyond TIA distance limits. Owner and Engineer shall not be responsible for out-of-distance outlets that are not tested prior to installation.

3.4 PATCH PANELS

A. Provide patch panels wired 568B in each communications closet to terminate data station cables. Mount in equipment racks. See detail drawings.

B. Mount patch panels on equipment racks or cabinets. See detail drawings.

C. Group connecting hardware for cables into separate logical fields.

3.5 HORIZONTAL PATHWAYS

A. In renovation projects, telecommunications cable pathways cannot always be accurately predicted and may need to be adjusted during construction. Direct pathways are needed to maintain cable length as required by this specification.

B. Horizontal cables between the telecommunications space and the work area outlet shall be no longer than 295 ft. (90 m). If a location is identified which appears to exceed the distance limitation, it shall be the responsibility of the Contractor to field verify the actual distance prior to installing the horizontal cable. Upon discovery of an over-length cable, the Contractor shall cease installation of the cable and immediately notify the Owner and Engineer. The Contractor shall follow this notification with a formal Request for Information (RFI). The Contractor shall consult with the Engineer and Owner to resolve the problem. There shall be no additional payment to the Contractor for rerouting of over-length cables which are discovered after installation.

3.6 PERFORMANCE TESTING

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-B.1 when tested according to test procedures of this standard.

B. Perform Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.

C. Provide certification reports in electronic native format.

D. Copper Cable Testing:
   1. Test horizontal cables from the punch-down blocks, patch panels, or other termination equipment, to the jacks unless otherwise noted.
   2. Utilize cable testing equipment capable of generating a report for each cable tested. Provide a hard copy report per TIA-568-B.
   3. Inspect for physical damage and test each conductor signal path for continuity and shorts. Test for faulty connectors, splices, and terminations.

E. Field Test Requirements for a 6 Balanced Twisted-Pair Cabling System:
   1. Test every cabling link in the installation in accordance with the Telecommunications Industry Association (TIA) Standard TIA-568B, 100-Ohm Twisted-Pair Transmission Performance and Field Test Requirements.
   2. The installed twisted-pair horizontal links shall be tested from the IDF in the telecommunications space to the telecommunications wall outlet in the work area against the “Permanent Link” performance limits specification as defined in TIA-568-B.
   3. Test 100 percent of the installed cabling links. All cable links must pass the requirements of the standards mentioned above and as further detailed below. Any failing link shall be diagnosed and corrected. Follow corrective action with a new test to prove the corrected link meets the performance requirements. Provide the final and passing result of the tests for all links in the test results documentation as specified below.
   4. Tests must be performed by trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof. Appropriate training programs include, but are not limited to, installation certification programs provided by BICSI or the ACP (Association of Cabling Professionals).
   5. The test equipment (tester) must comply with or exceed the accuracy requirements for the Level III field testers as defined in the TIA Cat 6 Document. The tester including the appropriate interface adapter must meet the specified accuracy requirements.
   6. The tester must be within the calibration period recommended by the manufacturer in order to achieve the manufacturer specified measurement accuracy.
   7. The tester interface adapters must be of high quality and the cable must not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. Provide proof that the interface has been calibrated within the period recommended by the manufacturer.
   8. Determine the Pass or Fail condition for the link-under-test by the results of the required individual tests as detailed below. Any Fail result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass (Pass* is not accepted).

F. UTP 4-Pair Performance Test Parameters:

1. Test all horizontal copper station cables for Category 6 according to the parameters set for in the TIA-568-B Standard. The test of each link must contain the following parameters as detailed below. In order to pass the link test, all measurements at each frequency in the range from 1 MHz through 250 MHz must meet or exceed the limit value determined in the above-mentioned standard.
2. Perform the following tests as defined in TIA-568-B: Wire map, length, insertion loss (attenuation), NEXT loss, pair-to-pair PSNEXT loss, ELFEXT loss, pair-to-pair PSELFEXT loss, return loss, ACR, PSACR, propagation delay and delay skew.

G. Approved Test Equipment Manufacturers
1. Horizontal Copper Test Equipment
   a. Agilent Technologies
   b. Fluke
   c. Ideal Industries

H. Test Result Documentation:
1. Record the test results information for each link in the memory of the field tester upon completion of the test.
2. Transfer the test results records saved by the tester into a Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records. Guarantee that the measurement results are transferred to the PC unaltered, i.e., “as saved in the tester”, at the end of each test and that these results cannot be modified at a later time.
3. Store and deliver the database for the completed job on CD-ROM including the software tools required to review, inspect, and print any selection of test reports.
4. Provide a paper copy of the test results that lists all the links that have been tested with the following summary information:
   a. The identification of the link in accordance with the naming convention defined in the overall system documentation.
   b. The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number.
   c. The date and time the rest results were saved in the memory of the tester.
5. Provide the following general information in the electronic database with the test results information for each link:
   a. The identification of the project site as specified by the end-user.
   b. The identification of the link in accordance with the naming convention defined in the overall system documentation.
   c. The overall Pass/Fail evaluation of the link-under-test.
   d. The name of the standard selected to execute the stored test results.
   e. The cable type and the value of NVP used for length calculations.
   f. The date and time the rest results were saved in the memory of the tester.
   g. The brand name, model, and serial number of the tester.
   h. The identification of the tester interface.
   i. The revision of the tester software and the revision of the test standards database in the tester.
   j. The test results information must contain information on each of the required test parameters that are listed above and as further detailed below.

6. The detailed test results data to be provided in the electronic database for each tested link must contain the results obtained for each parameter in accordance with the description above. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. In this case, the PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software shall also provide and print the summary numeric information for each test parameter as defined and prescribed by the TIA-568-B Standard document.

END OF SECTION

SECTION 27 1543

COMMUNICATIONS FACEPLATES AND CONNECTORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This Section includes the provision and installation of jacks, face plates, copper station cable termination, fiber optic station cable termination, labeling and associated hardware recognized as necessary and as described in the project drawings and in these specifications.

1.2 SUBMITTALS

A. Preconstruction Submittals:
   1. Product Data: Include data on features, ratings, and performance for each cable, component, termination methods and testing criteria for each component specified.
   2. Samples: For workstation outlets, jacks, jack assemblies, and faceplates for color
      a. Selection and evaluation of technical features.

B. Post-Construction Submittals:
   1. Construction Record Drawings.

1.3 QUALITY ASSURANCE

A. Comply with Section 27 0501 "Common Work Results for Communications".

B. Comply with Section 27 0553.01 "Identification for Communications Systems".

C. Comply with TIA-568-B.1 Commercial Building Telecommunications Cabling Standard Part 1 General Requirements.

D. Comply with TIA-568-B.2 Commercial Building Telecommunications Cabling Standard Part 2 Balanced Twisted-Pair Cabling Components.

E. Comply with BICSI Telecommunications Distribution Methods Manual, current edition.

1.4 PROJECT CONDITIONS

A. Coordinate with pathway/outlet box installer to ensure that faceplates are installed plumb and level flat to wall without gaps.

B. In situations where communications device mounting heights vary from the adjacent electrical devices match the electrical device mounting heights.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:
   1. CommScope.
   2. Ortronics.
   3. Panduit Corp.
   4. Systimax Connectivity Solutions.

2.2 SYSTEM REQUIREMENTS

A. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

2.3 MATERIALS

A. General:
1. All materials and products specified herein are to be new, unused, of first quality and delivered to site in original packaging or shipping containers unless otherwise indicated on the drawings.

B. Faceplates:
1. Modular Communications Faceplate:
a. Size: Single Gang
b. Outlet Positions: 4
c. Blanking Fillers: As required for unused jack openings
d. Material: Stainless Steel
e. Color: White

C. Connectors:
1. Information Port:
a. Mounting: Suitable for modular faceplate
b. TIA Category: 6
c. Pins: 8
d. Termination: T568B
e. Color: Blue

D. Surface Mount Boxes:
1. Outlet Positions: 2
a. Material: Plastic - Plenum Rated
b. Color: White

E. Accessories:
1. Patch Cords: Refer to Copper and Fiber Horizontal Cabling sections.
2. Labeling: Refer to Identification for Communications Systems section.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that outlet boxes are installed at proper height.

B. Verify that wall openings are neatly cut and will be completely covered by wall plates.

C. Verify that floor boxes are adjusted and installed properly.

D. Verify that openings in access floor are in proper locations.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Provide jacks as indicated on the drawings.

B. Plate configurations shall be as indicated on the detail drawings.

C. Provide a blanking filler for each unused faceplate opening.

D. Install devices, such as but not limited to faceplates and jacks, plumb and level.

E. Provide faceplates for all active and blank (spare) outlet locations.

F. Install devices securely, in a neat and workmanlike manner.

G. Work Area Communications Outlets Termination:
   1. Follow approved manufacturer's procedures for termination for the specific products installed and performance required.

3.4 INTERFACE WITH OTHER WORK

A. Coordinate locations of outlet boxes with other trades to obtain unified and consistent location and mounting heights specified.

3.5 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Test each communications port.

C. Label each wall plate and communications port.

3.6 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.7 CLEANING AND PROTECTION

A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 28 0500

COMMON WORK RESULTS FOR ELECTRONIC SECURITY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section describes basic design requirement specifications for electronic security systems (ESS). This section contains requirements that pertain to other Division 28 security specifications such as requirements for warranty, submittals, quality assurance, record drawings, installation, demonstrations and operator training. The term Security System Integrator (SSI) shall apply to the installation contractor for the division 28 security specification sections.

1.2 QUESTIONS OF INTERPRETATION DURING BIDDING PHASE

A. If questions arise during the bidding process regarding the meaning of any portion of the contract documents, the prospective bidder shall submit the questions to the Engineer for clarification.

B. Any definitive interpretation or clarification of the contract documents will be published by addenda, properly issued to each person holding documents, prior to the bid date.

C. Verbal interpretation or explanation not issued in the form of an addendum shall not be considered part of the bidding documents.

D. When submitting questions for clarification, adequate time for issuance and delivery of addenda must be allowed.

E. The Engineer shall be the sole judge regarding interpretations of conflicts within contract documents.

1.3 CONTRACT DOCUMENT DISCREPANCIES

A. If any ambiguities should appear in the contract documents, request clarification from the Engineer before proceeding with the work.

B. If the Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out the work in a manner satisfactory to the Engineer.

C. Should a conflict occur within the contract documents, the Contractor is deemed to have estimated the more expensive way of doing the work unless a written clarification from the Engineer was requested and obtained before submission of proposed methods or materials.

D. The Engineer shall be the sole judge regarding interpretations of conflicts within contract documents.

1.4 DEFINITIONS

A. Install: Supply labor to construct complete system, ready for intended use.

B. Furnish: Supply and deliver to the site, ready for use, items required to complete tasks or perform tests required to build a complete ready-to-use system.

C. Provide: Furnish, install, connect and test, supplying required labor to construct a complete system, ready for the intended use.

D. Contractors Field Test (CFT): Test performed by the contractor to verify device functionality in the field.

E. Performance Verification Test (PVT): Test performed by the contractor in the presence of the Owners Representative verifying a fully operational system.

1.5 SYMBOLS

A. Items of equipment and materials are indicated on the drawings in accordance with the Security Symbols Legend on the drawings. Some of the symbols scheduled may not be required for the project. Because of the scale of the Drawings, symbols are shown on Drawings as close as possible to the mounting location. Verify exact locations with the Architect and Owner's Representative.

1.6 ABBREVIATIONS

A. CCTV: Closed Circuit Television

B. DVR: Digital Video Recorder

C. EAC: Electronic Access Control

D. EMI: Electromagnetic interference

E. EVS: Electronic Video Surveillance

F. FACP: Fire alarm Control Panel

G. LAN: Local Area Network

H. LCD: Liquid Crystal Display

I. LED: Light-Emitting Diode Display

J. NEC: National Electrical Code, latest edition

K. NEMA: National Electrical Manufacturers Association

L. NFPA: National Fire Protection Association

M. NVE: Network Video Encoder

N. NVR: Network Video Recorder

O. PSTN: Public Switched Telephone Network

P. PTZ: Pan-Tilt-Zoom

Q. PVC: Polyvinyl chloride

R. SMS: Security Management System

S. SSI: Security System Integrator

T. STP: Shielded twisted pair

U. SPD: Surge Protection Device

V. UL: Underwriters Laboratories, Inc

W. UPS: Uninterruptible Power Supply

X. UTP: Unshielded twisted pair

Y. VMS: Video Management System

Z. WAN: Wide Area Network

1.7 CODES AND STANDARDS

A. The work shall be performed by competent craftsmen skilled in the trade involved and shall be done in a manner consistent with normal industry standards. All work shall conform to all applicable sections of currently adopted editions of the codes and standards listed below or the codes, standards, and specifications published by the organizations listed below:
   1. Safety and Health Regulations for Construction.
   2. Occupational Safety and Health Standards (OSHA), National Consensus Standards and Established Federal Standards.
   3. National Electrical Code (NEC), latest edition.
   4. American National Standards Institute (ANSI).
   5. National Electrical Manufacturer's Association (NEMA).
   6. Institute of Electrical and Electronics Engineers (IEEE).
   7. National Fire Protection Association (NFPA).
   8. American Society for Testing Materials (ASTM).
   9. Life Safety Code (NFPA 101).
   10. Underwriters' Laboratories, Inc., Standards (UL).
   11. Independent Testing Laboratories (ITL).
   12. International Organization for Standardization (ISO)
   13. Electrical Testing Laboratories (ETL).
   14. National Electrical Safety Code (NESC).
   15. Factory Mutual Engineering Corporation or other recognized national laboratories.
   16. Uniform Building Code (UBC).
   17. International Building Code (IBC)
   18. Building Officials and Code Administrators International, Inc. (BOCA).
   19. Building Industry Consulting Service International (BICSI).
   20. Telecommunications Industry Association (TIA).
   21. State and Local Codes.

B. Where there is a conflict between the code or referenced standards and the contract documents, the code or standard shall have precedence only when it is more stringent than the contract documents. Items that are allowed by the code but are less stringent than those specified shall not be substituted.

C. Follow Owner's installation standards unless otherwise shown on the drawings or stated herein. Where requirements of Installation Standards conflict with Performance Standards or manufacturer's recommendations, refer to Owner for a decision before proceeding. Owner's standards are listed below.

1.8 MATERIALS AND EQUIPMENT MANUFACTURERS

A. Options in selecting materials and equipment are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced on previous construction projects.

B. Materials and equipment shall be provided in accordance with the following:
   1. Primary Design Products: Primary design products are those products around which the project was designed in terms of capacity, performance, physical size and quality.

a. Primary design products are indicated by use of a single manufacturer's name, model number or similar data on drawings or schedules or within the specifications.
b. Provide primary design products unless substitutions are made in accordance with the following paragraphs.

2. Acceptable Equivalent Substitutions: Acceptable equivalent substitutions are products of manufacturers other than those listed for the primary design products. Equivalent acceptable substitutions shall meet each of the following requirements:
   a. The product shall be manufactured by one of the acceptable manufacturers listed in the Project Manual, drawings, or addenda.
   b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance, and physical characteristics.
   c. The Contractor providing the substitution shall bear the total cost of changes due to substitutions. These costs may include additional compensation to the Engineer for redesign and evaluation services, increased cost of work by the Owner or other Contractors, and similar considerations.
   d. Performance Requirements: Where the contract documents list performance requirements or describe a product or assembly generically, provide products that comply with the specific requirements indicated and that are recommended by the manufacturer for the respective application.
   e. Compliance with Standards, Codes and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations.
3. Proposed substitutions will be judged on the basis of quality, performance, appearance and on the governing space limitations. The reputation of the manufacturer, delivery time requirements, and the availability of repair or replacement parts may also be considered.
4. The Engineer shall be the sole and final judge as to the suitability of substitution items.

1.9 SUBMITTALS

A. Submittal Requirements:
1. Other section in the Project Manual shall be adhered to if more stringent than the following paragraphs.
2. When required by other sections of this Project Manual, submit shop drawings, product data or samples to the Engineer for review.
3. Submittals deemed unnecessary by the Engineer shall be returned indicating “No Action Taken”.
4. A completed copy of the transmittal form included with the Project Manual shall accompany each submittal.
5. Submittals shall be numbered consecutively by specification section (i.e. 28 0501-01, 28 0501-02).
6. Unless otherwise noted, submit one copy electronically of shop drawings and product data for review. Review comments will be returned electronically. A hard copy of the electronic submittal will be returned if requested.
7. Each submittal shall clearly indicate proposed items, capacities, characteristics and details in conformance with contract documents. Equipment items shall be marked with the same item number as used on drawings or schedules. Capacities, dimensions and special features required shall be certified by the manufacturer.

8. Submittals shall indicate manufacturer's delivery time for the item after review by the Engineer.
9. When required by other sections of this Project Manual, the Contractor shall submit a Specification Compliance Review consisting of a paragraph-by-paragraph review of the specifications and addenda with the following marked for each paragraph. Markings may be made in the margins of the original specification or addenda. Unless a deviation or exception is specifically noted in the Specification Compliance Review, it is assumed that the equipment, product, or material is in complete compliance with the contract documents. Submit Specification Compliance Review with shop drawings and product data.
    a. "A": Reviewed, No Exceptions Taken.
    b. "B": Reviewed, Exceptions Taken as Noted.
    c. "C": Revise and Resubmit.
    d. "D": Rejected.
    e. "E": No Action Taken.
10. The Engineer shall review or take other appropriate action upon the Contractor's submittals such as shop drawings, product data and samples, but only to determine conformance with the design concept of the work and the information given in the contract documents.
11. Contractor shall not be relieved of responsibility for any deviation from the requirements of the contract documents by the Engineer's review of shop drawings, product data or samples.
12. Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings, product data or samples by the Engineer's review of those drawings.
13. No portion of the work requiring submission of a shop drawing, product data or sample shall be commenced until the submittal has been reviewed by the Engineer. Such portions of the work shall be in accordance with reviewed submittals.
14. The successful Contractor/Supplier may, at their option, obtain DXF or AutoCad DWG electronic drawing files on CD-ROM for use in preparation of shop drawings.
    a. This information is available from Alvine Engineering or IP Design Group upon written request.
    b. The use of these drawing files is intended solely for the preparation of drawings as required by these contract documents.
    c. Any other use is strictly prohibited by copyright laws.
    d. The user of these electronic drawing files assumes full responsibility for their accuracy and scale.

B. Pre-Construction Submittals
1. Shop Drawings
    a. Shop drawings are drawings, diagrams, schedules and other data specifically prepared for this project by the Contractor, Manufacturer, Supplier, or Distributor to illustrate some portion of the work. Shop Drawings shall also detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment. Shop drawings shall included, but not limited to, the following:
        1) Functional block/wiring diagrams showing tsingle-line interconnections between compoennts for signal transmission and control. Show cable types, quantities, and sizes.
        2) Dimensioned plans and elevations of equipment racks/enclosures.
    b. Shop drawings shall be drawn to accurate scale and of adequate size to illustrate required details.

c. Maximum sheet size shall be 30 inches by 42 inches. For each hard copy shop drawing sheet larger than 11 inches by 17 inches, submit one drawing on reproducible media.
d. The Engineer's action shall be indicated on the reproducible drawing and the drawing shall be returned to the Contractor.

2. Product Data
   a. Product data are illustrations, standard schedules, performance charts, instruction brochures, diagrams and other information furnished by the Contractor, Manufacturer, Supplier, or Distributor to illustrate a material, product or system for some portion of the work.
3. Programming Data:
   a. Device names and descriptions.
   b. Complete written sequence of operations for all functions of the system.
4. Performance Verification Test Reports (PVT): A proposed test plan shall be submitted to the Owner's representative for approval prior to commencement of testing.

C. Operation and Maintenance Manuals Submittal:
1. Prepare three (3) operation and maintenance manuals for the equipment furnished. Manuals shall be submitted to the Engineer for review and distribution to the Owner not less than 30 days prior to substantial completion of the project. Manuals not meeting the following requirements may be rejected by the Engineer.
2. Each manual shall be assembled in a three-ring binder with hard cover and plastic finish. Binders shall not exceed a 3-inch thickness. Where more than one binder is required, the manuals shall be separated into a logical grouping, i.e., "Telecommunications", “Audiovisual”, “Maintenance”, “Operation”, “Parts”, "Shop Drawings”, etc. Each binder shall have the following information clearly printed on its front cover:
   a. Project name and address.
   b. Portion of the work covered by each volume (if more than one volume in the set). Where more than one volume is required, label each volume as “Volume _____ of _____”.
   c. Name, address and telephone number of Contractor and Sub-Contractors including night or emergency number.
3. Manual shall include, but shall not be limited to, the following:
   a. A Complete Index. Contractor may submit the index to the Engineer for review prior to submittal of complete manuals if desired.
   b. Names, Addresses and Telephone Numbers. This list shall include the manufacturer and local representative who stocks or furnishes repair parts for all items of equipment and shall be typed on a single page in front of the binder.
   c. Startup, Operation and Shutdown Procedures. Provide a written description of procedures for startup, operation and shutdown of each electrical item or system. This description shall include switches to operate, buttons to push, etc., in proper sequence, and the location of switches, starters, and pushbuttons. Description shall include item references or labels used in the contract documents unless otherwise instructed in advance by the Owner.
   d. Equipment Accessory Schedule. Upon completion of the work, furnish the Owner with a complete equipment accessory schedule listing each piece of equipment and the related size, type, number required and the manufacturer of renewable items.
   e. Manufacturer's Operation and Maintenance Manuals and Parts Lists.
   f. Emergency Procedures. Provide a written description of emergency operating procedures or a list of service organizations (including

addresses and telephone numbers) capable of rendering emergency services to the various parts of the system.

g. One copy of shop drawings and product data, clearly marked for each item furnished using the designation label specified or indicated on Drawings.

h. Manufacturers' warranty information.

i. Normal Maintenance Schedule. Include a listing of work to be performed at various time intervals; i.e., 30, 90, 180 days and yearly.

j. Hardware Manual:

1) Names, Addresses and Telephone Numbers. This list shall include the manufacturer and local representative who stocks or furnishes repair parts for all items of equipment and shall be typed on a single page in front of the binder.

2) One copy of all shop drawings and product data, clearly marked for each item furnished using the designation label specified or indicated on drawings.

3) Installation and check out procedures

4) Alignment and calibration procedures

k. Software Manual: The manual shall describe the functions of all software and shall include all other information necessary to enable proper loading, testing, and operation.

1) Definition of terms and functions

2) System use and application software

3) Initialization, start up, and shut down

4) Reports generation

5) Details on forms customization and field parameters

l. Operators Manual: The manual shall fully explain all procedures and instructions for the operation of the system.

1) Computers and peripherals

2) System start up and shut down procedures

3) Use of system, command, and applications software

4) Recovery and restart procedures

5) Graphic alarm presentation

6) Use of report generator and generation of reports

7) Data entry

8) Operator commands

9) Alarm messages and reprinting formats

10) System permissions functions and requirements

D. Post-Construction Submittals

1. Field quality-control test reports.

2. As-built drawings:

a. Maintain current documents at the construction site. Submit with Operations and Maintenance Manuals.

b. As-built drawings shall include the following:

1) As-built shop drawings

2) Station outlet/device labeling.

3) Routing of cables from equipment cabinets to devices.

4) Revisions to construction documents (addenda and field changes.)

5) Floor plans with all final device and equipment cabinet locations and labeling.

3. When required by specification sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, adjusting, and finishing, in quantities specified for shop drawings and equipment brochures.

1.10 OPERATING TRAINING

A. Complete operating instructions for each system and item of equipment shall be provided to the Owner's designated personnel.

B. Operation and Maintenance Manuals must be reviewed and accepted by the Engineer and provided to the Owner prior to operating training.

C. Training shall be scheduled at the convenience of the Owner. A minimum of 4 hours of training shall be provided.

D. Training shall include, but not limited to, instructions on the following:
1. Startup and shutdown procedures
2. Periodic maintenance
3. Emergency operation
4. Configuration and setup
5. Issuing credentials
6. Creating and editing user accounts.
7. Creating and exporting reports
8. Setting up alerts/alarms
9. Configuring and setup of devices
10. Setting up schedules
11. Using the software
12. Using the mobile application
13. Additional training identified in other sections

E. In addition to the instructions required above, wherever possible perform the operations being described in order to fully illustrate system operation.

F. At the completion of training, the Contractor shall turn over to the Owner all required keys and special tools for installed equipment. Each key or tool shall be labeled with its use.

1.11 QUALITY ASSURANCE

A. Installer Qualifications: An Experienced installer who is an authorized representative of equipment manufacturer with industry accepted experience relative to size and nature of project.

B. The work specified in these specifications and construction documents shall be accomplished by an experienced Contractor in the design, fabrication, installation, checkout and warranty contract management of systems such as those being described in each Section.

C. Installer shall employ only a qualified PM-Project Manager and must meet the following requirements: Required participation in meetings and conferences. Be present at Project site for Substantial Completion Inspection, Final inspection, approves the operating and maintenance manuals and to provide any additional instructions as needed to designated members of the Owner’s staff.

D. Be responsible for supervision of all technical work that is part of this Specification.

E. Supervise preparation of shop drawings and submittals and sign all submittals.

F. Supervise the shop fabrications and field installation work to assure strict conformance in accordance to the Contract Drawings, Specifications and the reviewed Shop Drawings to assure workmanship of the specified quality.

G. Oversee the testing of all assemblies and all sub-assemblies prior to their delivery at the Project Site.

H. Lead in the specified testing of completed installation to assure the Owner that all Contract Requirements were met. Working with and assisting the Owner in the final testing for approval and acceptance of the system by Owner.

1.12 WARRANTIES

A. The Contractor shall warrant all materials, workmanship, and equipment against defects for a period of one year after the date of substantial completion. Certain equipment shall be warranted beginning at the time of final acceptance or for longer periods of time as specified in those sections of the Project Manual. The Contractor shall repair or replace, at no additional cost to the Owner, any item which may become defective within the warranty period. Any manufacturers' warranties concerning any item installed will run to the benefit of the Owner. The Contractor agrees not to void or impair, or to allow Sub-Contractors to void or impair, any warranties regarding products or items installed as part of this project. The repair of faulty workmanship shall be considered to be included in the contract.

B. Warranty Maintenance and Service Agreement:
   1. General Requirements: The contractor shall provide all services required and equipment necessary to maintain the entire ESS in an operational state as specified for a period of one year after formal written acceptance of the system, and shall provide all necessary material required for performing scheduled service or other unscheduled work.
   2. Personnel: Service personnel shall be factory certified in the maintenance and repair of the equipment installed under this section of the specification. The owner shall be advised in writing of the name of the designated service representative, and of any change in personnel.
   3. Description of Work: The service and repair of the ESS including all equipment provided under this specification supplied by the successful contractor. The contractor shall provide the manufacturer's required scheduled and unscheduled maintenance and all other work necessary to keep the ESS at its maximum performance.
   4. Schedule of Work: This work shall be performed during regular working hours, Monday through Friday, excluding federal holidays.
      a. Inspections: The Contractor shall perform two minor inspections at 6 month intervals (or more often if required by the manufacturer), and two major inspections offset equally between the minor inspections to effect quarterly inspection of alternating magnitude.
      b. Minor Inspections: These inspections shall include:
         1) Visual checks and operational tests of all console equipment, peripheral equipment, field hardware, sensors, and electrical and mechanical controls.
         2) Mechanical adjustments if required on any mechanical or electromechanical devices.
      c. Major Inspections: These inspections shall include all work described under paragraph Minor Inspections and the following work:
         1) Clean all ESS equipment, including interior and exterior surfaces.
         2) Perform diagnostics on all equipment.
         3) Check, walk test, and if required by the manufacturers' maintenance procedures, calibrate each sensor.
         4) Run all system software diagnostics and correct all diagnosed problems.

5. Operation: Performance of scheduled adjustments and repair shall verify operation of the ESS as demonstrated by the applicable tests of the performance verification test.
6. Emergency Service: The owner will initiate service calls when the ESS is not functioning properly. Qualified personnel shall be available to provide service to the complete ESS. The owner shall be furnished with a telephone number where the service supervisor can be reached at all times. Service personnel shall be at site within 24 hours after receiving a request for service. The ESS shall be restored to proper operating condition within 24 hours after service personnel arrive on site.
7. Records and Logs: The Contractor shall keep records and logs of each task, and shall organize cumulative records for each component and for the complete system chronologically. A continuous log shall be maintained for all devices. The log shall contain all initial settings. Complete logs shall be kept and shall be available for inspection on site, demonstrating that planned and systematic adjustments and repairs have been accomplished for the ESS.
8. Work Requests: The Contractor shall separately record each service call request on a service request form. The form shall include the model and serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials used, the time and date work started, and the time and date of completion. The Contractor shall deliver a record of the work performed within 5 days after work is accomplished.
9. System Modifications: The Contractor shall make any recommendations for system modification in writing to the Owner. No system modifications, shall be made without prior approval of the Owner. Any modifications made to the system shall be incorporated into the operations and maintenance manuals, and other documentation affected.
10. Software: The Contractor shall provide all software updates during the period of the warranty and verify operation in the system. These updates shall be accomplished in a timely manner, fully coordinated with ESS operators, shall include training for the new changes / features enabled, and shall be incorporated into the O&M manuals.

1.13 REFERENCE STANDARDS

A. The Contractors performance of work shall comply with applicable federal, state and local laws, rules and regulations. The Contractor shall give required notices, shall procure necessary governmental licenses, permits and inspections and shall pay without burden to the owner all fees and charges in connection therewith unless specifically provided otherwise. In the event of violation, the contractor shall pay all fines and penalties including attorney's fees and other defense costs and expenses in connection therewith.

B. Federal Communications Commission (FCC) registration or approval for any equipment requiring such approval shall be appropriately identified and obtained by the Contractor.

C. Design, manufacture, test and install communications cabling networks per manufacturers' requirements, state codes, local codes, requirements of authorities having jurisdiction and particularly the following standards:
1. Comply with NFPA 70, National Electric Code
2. Comply with NFPA 101, Life Safety Code
3. Comply with NFPA 730, Guide for Premises Security
4. Comply with NFPA 731, Standard for the Installation of Electronic premises Security Systems,
5. Comply with American Disabilities Act (ADA)
6. Comply with International Building Code (IBC)

7. Comply with IEEE C62.41.1-2002, Guide on the Surge Environment in Low-Voltage AC Power Circuits
8. Comply with ANSI-310-D-92, Racks, Panels, and Associated Equipment
9. Comply with ANSI/TIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications.

D. Follow Owner's installation standards unless otherwise shown on the drawings or stated herein. Where requirements of Installation Standards conflict with Performance Standards or manufacturer's recommendations, refer to Owner for a decision before proceeding.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.14 COORDINATION

A. Coordinate and schedule all construction work with the Owner and occupant prior to beginning work. Do not interrupt building activities without strict coordination with the Owner and occupant. Unscheduled appearance to work in the spaces without prior scheduling with the Owner and occupant is not allowed.

B. The Contractor shall attend all meetings as required by the General Contractor.

C. Convene a meeting one week prior to commencing the work of this section.
1. Agenda:
   a. Tour, inspect and discuss building conditions related to the structured cabling system.
   b. Review submittals both completed and yet to be completed.
   c. Review plans, specifications and proposed equipment.
   d. Review construction schedule, availability of materials, personnel, equipment and facilities needed to proceed without delay.
   e. Review required inspections and testing.
   f. Review cable routing, cable support, primary pathways and communications spaces location and environmental conditions.

D. The Contractors Project Manager must be available on-site when needed and readily available.

E. Coordinate network configuration requirements for electronic security equipment with Owner's IT staff.

F. Record agreements reached in meetings and distribute to other participants.

G. Coordinate security device rough-ins/conduit and door/door frame prep with general construction work and arrange in building structure during progress of construction to facilitate the security installations that follow.

H. Coordinate exact location(s) of ceiling mounted equipment/devices with architectural plans, reflected ceiling plans, structural plans and all affected trades prior to construction and installation.

I. Coordinate exact location(s) of all desk/counter top mounted security equipment with Millwork/Casework and furniture plans prior to installation.

J. Fully examine the drawings and specifications for other trades and coordinate the installation of security work with the work of the other trades. Consult and cooperate with the other trades for determining space requirements and for determining that adequate clearance is allowed with respect to his equipment, other equipment, and the building.

K. Coordinate installation and cabling with the raceway installer. Verify raceways are installed according to the plans and specifications before installing cable.

L. Provide offsets and elevation changes in piping, conduit and devices as required to complete the Layout and Coordination Process. Offsets and elevation change information shall be indicated in the coordination process documentation and must be submitted for review.

1.15 DELIVERY, STORAGE AND HANDLING

A. Security equipment shall neither be delivered nor installed until the building is totally enclosed, secured, weather tight and all dust or moisture generating construction work within the building is complete and cured. Care shall be taken to protect equipment from damage until the date of substantial completion of the project

PART 2 - PRODUCTS

2.1 PERFORMANCE, CAPACITIES AND CHARACTERISTICS

A. See Drawings for Equipment Schedules for Equipment Performance Requirements when capacities and characteristics are not indicated in the specifications.

2.2 **MATERIALS**

A. The Contractor's options in selecting materials and equipment are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Materials and equipment shall be provided in accordance with the following:

1. Primary Design Products: Primary design products are those products around which the project was designed in terms of capacity, performance, physical size and quality. Primary design products are indicated by use of a single manufacturer's name, model number or similar data on drawings or schedules or within the specifications. The Contractor shall provide primary design products unless substitutions are made in accordance with the following paragraphs.
2. Acceptable Equivalent Substitutions: Acceptable equivalent substitutions are products of manufacturers other than those listed for the primary design products. Equivalent acceptable substitutions shall meet each of the following requirements:
    a. The product shall be manufactured by one of the acceptable manufacturers listed in the Project Manual, drawings or addenda.
    b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance and physical characteristics.
    c. The Contractor providing the substitution shall bear the total cost of all changes due to substitutions. These costs may include additional compensation to the Architect/Engineer for redesign and evaluation services, increased cost of work by the Owner or other Contractors, and similar considerations.
    d. Performance Requirements. Where the contract documents list performance requirements or describe a product or assembly generically, provide products that comply with the specific requirements indicated and that are recommended by the manufacturer for the respective application.
3. Compliance with Standards, Code and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations.

4. Proposed substitutions will be judged on the basis of quality, performance, appearance and on the governing space limitations. The reputation of the manufacturer, delivery time requirements, and the availability of repair or replacement parts may also be considered. All proposed substitution must be submitted to the Architect/Engineer for prior approval at least 10 days prior to the final Addendum.
5. The Architect/Engineer shall be the sole and final judge as to the suitability of substitution items.

2.3 MANUFACTURERS

A. Refer to the individual specification sections for manufacturers.

2.4 COMPLETENESS OF WORK

A. The contract documents depict security systems which are intended to be complete and functioning systems. All products, labor and programming necessary to render a full and functional system to fulfill the design intent shown on the documents shall be provided by the Contractor.

B. Catalog numbers referenced throughout the drawings and specifications are intended to convey the understanding of the type and quality of the product required. Where written descriptions differ from information conveyed by a catalog number the written description shall govern. No extra charge will be allowed because a catalog number is found to be incomplete or obsolete.

2.5 MATERIALS AND EQUIPMENT FURNISHED BY OTHERS

A. Where materials and equipment are indicated as furnished by others and installed or connected under this contract, it shall be the Contractor's responsibility to verify installation details and requirements.

2.6 QUANTITY OF SPECIFIED ITEMS REQUIRED

A. Wherever in these specifications an article, device or piece of equipment is referred to in the singular number; such reference shall apply to as many such articles as are shown on the drawings or required to complete the installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Proceed with installation only after unsatisfactory conditions have been corrected.

B. For digital serial communication devices that are close to distance limits of the serial protocol being used (RS-232, RS-422, RS-485, Weigand), run a length test on proposed routing to said device. Inform Owner and Engineer of any devices beyond Recommended Standard (RS) distance limits. Owner and Engineer shall not be responsible for cables that exceed Recommended Standard distance limits.

3.2 INSTALLATION

A. Install cables without damaging conductors, shield, or jacket.

B. Provide SPD devices in the security cabinets for any security device located in outdoor locations.

C. Bond security cabinets with minimum #6 AWG ground wire to nearest Telecommunications Ground Bar (TGB) when cabinets are located within the telecom room. Bond ground bus bar to approved ground rod installed by the electrical contractor when security cabinets are located in outdoor locations.

D. Install security cables continuous from the device location to the security cabinet serving that area, or between security cabinets. If a splice is required, provide tamper-resistant “torx with peg” security fasteners for junction boxes containing security cable splices.

E. All security devices located outdoors shall be rated as weather proof.

F. Furnish tools and test equipment. Provide all specified materials, installation hardware, and labor required to complete work shown on drawings and specified in this Section. This shall include work and miscellaneous items not specified but necessary to build a complete system installation including test equipment accessories and appurtenances required for testing the system. All systems shall be complete and ready for operation.

G. Use cable bundling hardware rated for the environment and application in which used. Applications include, but are not limited to, general purpose, outdoor, chemical resistant, flame retardant, high temperature, and vibration. Provide reusable cable management straps for bundling and securing cables. Do not use nylon cable ties.

H. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer. Do not exceed cable manufacturer's recommended pulling tensions.

I. Install exposed cables parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.

J. Secure and support cables at intervals not exceeding 48 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

K. Wiring within Equipment Rooms and Enclosures: Provide conductors of adequate length. Train conductors to terminal points with no excess.

L. Bring to the attention of the Owner and Engineer conflicts between manufacturer’s instructions and Contract Documents.

3.3 FIRESTOPPING

A. Firestop all smoke and fire rated walls, partitions and openings after the installation of communications cabling in sleeves and pathways. Firestop material shall be approved for use with the communications cables and jackets being installed.

3.4 RECORD DRAWINGS

A. Maintain current documents at the construction site.

B. Record drawings shall include all information required for shop drawings and, in addition, shall indicate the following:
   1. Routing of cables between communications rooms and from communications rooms to entrance facilities.
   2. Revisions to construction documents (addenda and field changes).
   3. Record drawings shall include all construction changes posted to all portions of the documents including but not limited to communications floor plans, expanded plans, wall and rack elevations, schematics, labeling and installation details. Record documents shall include and clearly show final cable labeling designations down to the individual outlet and port.

4. Record drawings shall be complete and organized to be suitable for use as disaster recovery and cable infrastructure administration documents.

C. Final drawing shall be provided to Engineer in electronic format.

D. Post a complete set of record documents in the security command center or security equipment room serving the project. In each security equipment room post a final floor plan of the outlets served by each room on the wall behind a protective plexiglass wall frame.

3.5 FIELD QUALITY CONTROL

A. Performance Verification Tests:
1. Notify Architect and Owner's representative in writing, in advance of testing to prevent delays in construction schedules.
2. Test all systems and place in proper and specified working order prior to demonstration of the systems.
3. Test system grounds to demonstrate that the ground resistance does not exceed the requirements of UL 1449 Surge Protection Device (SPD) and the National Electric Code (NEC).
4. Perform tests, as required, by authorities having jurisdiction over the site.
5. Testing shall be in the presence of the Owner's designated representatives, Contractor, Architect and representatives of the authorities having jurisdiction.

B. Verification of Performance:
1. Prior to acceptance of the work, the security system integrator/installer (SSI) shall demonstrate to the Owner, designated representatives, Contractor, Architect and representatives of the authorities having jurisdiction, all subsystems, features and functions of the system, and shall instruct the Owner in the proper operation and event sequences of the system. Check for correct connections and test for short circuits, ground faults, continuity, and insulation before energizing any cables and wires.

C. Where systems have been expanded and/or upgraded, the SSI shall provide the personnel and labor to completely test and demonstrate all new, existing, and upgraded software and hardware.

D. Demonstrate each system and subsystem. The demonstration is to consist of no less than the following:
1. Designate actual location of each component of a system or sub-system and demonstrate its function and its relationship to other components within the system.
2. Verify final field of view for all fixed cameras
3. Demonstrate the systems and subsystems operations by actual "START/STOP-ON/OFF-OPEN/CLOSE" cycling showing how to work controls, how to reset devices, how to replace fuses and emergency operating/operations procedures.
4. Trip all alarm and intrusion detection devices and verify response of alarm and trouble signals.
5. Check Installation, supervision, and operation of all intelligent, addressable initiating and control devices by physically testing each device in accordance with the manufactures requirements.
6. Each of the alarm conditions that the system is required to detect shall be introduced on the system. Verify the proper receipt and the proper processing of the signal at the Front-end processing unit and the correct activation of all control points and the sequence of operations.

E. Activate each installed access control/security device through the Front-end processing unit and verify proper system operation.

F. Tag all equipment, stations, and other components for which tests have been satisfactorily completed.

G. SSI shall furnish the necessary trained personnel to perform the demonstration and instructions and arrange to have the manufacturer's representatives present to assist with the demonstrations. Training time shall include, as a minimum, the total time determined by the sum of the times specified in each section, for performing the prescribed demonstrations/training.

H. SSI shall arrange with the Owner's designated representative the date and times for perform the demonstrations. The Owner will select date and time for demonstration.

I. Comply with requirements of Division 01 – System Demonstrations.

3.6 DEMONSTRATION

A. Participate in project site observations, walk-throughs, and punch lists as requested by the Owner or the Architect/Engineer.

B. Demonstrate completeness of work relative to completion percentages submitted for payment.

3.7 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish.

B. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

3.8 INSPECTIONS

A. At the completion of the project and prior to final acceptance of the work, provide evidence of final inspections and approvals to the Owner, as required by the authorities having jurisdiction to requirements of Division 01.

3.9 TRAINING

A. The Contractor shall provide the Owner's Representative with training for operating the system as required by this specification. The Contractor shall provide actual field demonstrations of the operation of all system components and the entire system installed in the building.

B. The Contractor shall provide 4 hours of formal training for the Security System to the Owner's Representative, scheduled at their direction. The training shall consist of two, 2-hour training sessions and shall cover system operation, hardware configuration and basic maintenance skills.

C. The Contractor shall provide the Owner's Representative with training for operating the system as required. An additional 4 hours of technical training shall be given to the Security and Engineering staff. The technical training shall consist of two, 2-hour training sessions.

D. The Contractor shall submit training agendas and materials to the Engineer for review prior to scheduling training.

E. Prepare a written record of tests, inspections, and detailed test results in the form of a test log.

3.10 ADJUSTMENTS

A. Within one year of date of Substantial Completion, provide up to three Project site visits, when requested by Owner, to adjust and calibrate components and to assist Owner's personnel in making program changes and in adjusting equipment and controls to suit actual conditions. Visits for this purpose shall be in addition to any required by warranty.

END OF SECTION

SECTION 28 2300

ELECTRONIC VIDEO SURVEILLANCE SYSTEM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. This section includes necessary components required to provide a complete and fully functional electronic video surveillance (EVS) system including, but not limited to, servers, cameras, licensing, and installation for wiring systems to be used for connection for equipment/devices.

B. The EVS server is new and will serve as the key component for managing the video surveillance system outlined in these specifications and construction drawings. The system shall provide full video control, monitoring, and recording as outlined in these specifications and construction drawings. The equipment and devices provided herein shall integrate with the server.

1.2 SYSTEM DESCRIPTION

A. The basis of the design is to provide to the owner a distributed digital video surveillance system supplied by the Contractor. The system shall be complete and operational per the performance requirements and objectives of these specifications. The EVS shall meet the following requirements at a minimum:
   1. Refer to the "Security Camera Schedule" for additional information

1.3 SUBMITTALS

A. PRE-CONSTRUCTION SUBMITTALS
   1. Product Data: As specified in section 28 0500
   2. Shop Drawings: As specified in section 28 0500
   3. EVS Camera Schedule: Provide programming information in spreadsheet format to include, but not be limited to, the following information by camera: License information, mounting type, mounting height/location, field of view, and camera name/indicator.

1.4 QUALITY ASSURANCE

A. Environmental: Do not deliver or install equipment, and cabling to the equipment room or install termination hardware until security equipment rooms are enclosed, painted, water-tight, complete, dry and work above and in ceiling spaces is complete.

B. Coordinate location of power raceways and receptacles with locations of security equipment requiring power to operate. Coordinate with Division 26.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following pre-approved manufacturers:
   1. EVS Video Mangement Software/Hardware:
      a. Genetec
      b. Milestone
      c. S2
   2. EVS Cameras:
      a. Axis

b. Panasonic
c. Sony

3. EVS Power/Signaling:
   a. Altronix
   b. Ditek
   c. Nitek
   d. NVT
   e. Transtector
4. LAN Equipment:
   a. Cisco
   b. Dell
   c. HP
   d. BCDVideo
5. Security Equipment Racks/Cabinets:
   a. Chatsworth
   b. Hoffman
   c. Panduit

2.2 SYSTEM REQUIREMENTS

A. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

2.3 **CAMERAS**

A. Refer to Camera Schedule.

2.4 **VIDEO MANAGEMENT SOFTWARE AND HARDWARE**

A. Design Basis: Genetec Omnicast.

B. Provide software edition as required to meet the detail drawings, as well as the features and functions outlined within these specifications.

C. Provide all additional client, server, and camera licenses/dongles required for the system as specified herein. Provide all 3rd party software licenses as required for the proper operation of the system.

D. Software shall be capable of providing an unified platform for the electronic security systems. The software shall be a single intuitive interface for simplistic operations. The software shall be capable of operating the electronic security systems on a single server platform and system.

E. Database Server:
   1. The database server software shall be capable of supporting an unlimited number of cameras (limited only by licensing).
   2. The database server shall also support an unlimited number of system events and System Operator transactions in the history file limited only by available hard disk space.
   3. Provide failover server

F. Recording Server: Provide manufacturer's recommend storage server to hold the required storage as indicated on the detail drawings. Existing analog cameras shall be incorporated into the storage.

G. The following functions and features shall be provided and configured as required by the Owner. These features are in addition to the required setup and programming required to provide a fully functioning EVS system.

1. Dynamic Graphical Floor Plan Mapping for all of the security devices.
2. Email and SMS alerts.
3. Integration and programming with the following Video Analytics (Future):
    a. Facial Recognition
    b. License Plate Recognition
4. Web Client
5. Unlimited Client PCs.
6. Camera Audio Support and Recording.
7. Analog PTZ and Fixed camera support.
8. Analog joystick support.

H. EVS Server and Hardware
1. Physical EVS Server:
    a. Server shall be utilized for the electronic security systems via an unified platform.
    b. The server shall include, but not limited to, the following:
        1) The EVS Server shall meet the minimum requirements currently published by the EVS software manufacturer at the time of purchase.
        2) Fault Tolerant options:
            a) The Server shall be a self-contained fully redundant system (dual module / mirrored components) with on-line serviceability and hot-swappable replacement of all major subsystems including processors, power supplies, PCI bus and SCSI controllers. The server shall provide 99.999% system up time.
        3) Hot Standby Server options:
            a) The Server shall support fully redundant hot standby server architecture. In the event of a failure on the primary server, the system will switch over to the secondary server without operator intervention.
            b) All access control field hardware shall be configured for communication with both the Primary Server and the Backup Server. Both the Primary and Backup Servers shall recognize the same TCP/IP ISC address on the network.
            c) The Hot Standby Server Option shall require two identical servers with a minimum configuration as outlined above.
        4) Server form factor shall be 19" Rack Mount.
2. Physical Recording Server:
    a. The server shall meet the minimum requirements currently published by the EVS software manufacturer, as well as, the detail drawings.
    b. Chassis: 2U rackmount
    c. OS Supported: Windows Server 2012 R2/2016
    d. Network Ports: (4) 1GbE, (1) Management, (2) 10GbE LAN
    e. RAID Level: 6
    f. Fault Tolerant options:
        1) The Server shall be a self-contained fully redundant system (dual module / mirrored components) with on-line serviceability and hot-swappable replacement of all major subsystems including processors, power supplies, PCI bus and SCSI controllers. The server shall provide 99.999% system up time.
    g. Hot Standby Server options:

1) The Server shall support fully redundant hot standby server architecture. In the event of a failure on the primary server, the system will switch over to the secondary server without operator intervention.
2) All access control field hardware shall be configured for communication with both the Primary Server and the Backup Server. Both the Primary and Backup Servers shall recognize the same TCP/IP ISC address on the network.
3) The Hot Standby Server Option shall require two identical servers with a minimum configuration as outlined above.

h. Server shall be capable of storing, ata minimum, of 60 days for the existing and new cameras being provided. Provide appropriate quantity of servers for adequate storage.

3. EVS Client Workstation:
   a. The EVS client workstations setup shall be provided by the SSI.
   b. The Client workstation shall be utilized for the electronic security systems via the unified platform.
   c. Configure 11 EVS workstation(s) with the manufacturer's recommended EVS software.
   d. The EVS client workstation shall meet the minimum requirements currently published by the EVS software manufacture at the time of purchase.
   e. Client workstation form factor shall be Desktop.
   f. Provide new workstations as indicated on detail drawings.
   g. Configure existing workstations as indicated on detail drawings.
   h. Refer to LAN equipment section for additional information.

I. EVS System Hardware
1. Desk-Mount Display:
   a. Design Basis: Planar PXL2780MW
   b. Display shall be a 27 inch LED.
   c. Provide desk-mounted display for each new workstation for video surveillance system viewing.
   d. Set-up display to view the required video surveillance cameras as required by the Owner.
   e. Required Inputs:
      1) HDMI
2. HDMI Transceiver Set
   a. Design Basis: Crestron HD-EXT4-C-B_System
   b. 4K HDMI over HDBaseT extender.
   c. Provides video and audio signals up to 330 feet.
   d. Utilize Cat-6 cabling between devices.
   e. Provide devices, cabling, and patch cords for required displays.
   f. Mount devices neatly and cleanly.
3. HDMI Distribution Amplifier
   a. Design Basis: Crestron HD-DA4-4K-E
   b. 1 to 4 4K HDMI distribution amplifier.
   c. 1 HDMI input signal and 4 HDMI output signals.
   d. Mount device neatly and cleanly.
4. Pull-out Keyboard Video Monitor (KVM):
   a. Design Basis: Belkin Titan
   b. Provide KVM within main security equipment room near the EVS server location.

2.5 HARDWARE

A. Network Video Encoder:
   1. Chassis:
      a. Design Basis: Axis 291 1U video server chasis
      b. Shall be a rack mounted chassis that can accommodate individual blade server slots on back for connection to DVMS switch.
   2. Encoder:
      a. Design Basis: Axis P7224
      b. Each blade video server shall provide the following capabilities and configurations:
         1) Four channels
         2) Motion JPEG/MPEG-4 video compression
         3) Total Frame Rate (NTSC/PAL): 120/100
         4) Video motion detection
         5) Four alarm inputs
         6) Four alarm outputs
         7) PTZ support

2.6 **POWER/SPD/SIGNALING**

A. POE IP camera SPD.
   1. Design Basis: Ditek MRJPOE
   2. Provide SPD for all exterior building mount cameras. SPD shall be mounted within equipment room where the camera cabling terminates. Refer to detail drawings.

B. Camera Rack-Mount Fiber Transceivers with Power Supply
   1. Design Basis: Altronix NetWaySP4P Series
   2. Provide fiber transceiver with built-in power supply for powered fiber hybrid cabling to support the exterior pole mount cameras.
   3. Power supply shall have 4 ports to terminate cabling.
   4. Power supply shall be capable of supplying, at a minimum, of 60 W per port.
   5. Provide SFPs for both the power supply and camera. SFPs shall be approved by Owner prior to procurement and shall be compatible with the power supply.
   6. Rack-mount power supply as indicated in detail drawings.

C. Camera Fiber Optic PoE Extenders
   1. Design Basis: CommScope PoE Extender
   2. Provide PoE extender for each exterior pole mount camera. Extender shall be compatible with powered fiber hybrid cable and rack-mount power supply. Install extender on pole per manufacturer's recommendations.
   3. Enclosure: IP67 Exterior rated.
   4. Ports: 1 port, 60 W PoE rated.
   5. Integral fiber optic splicing.
   6. Integral circuit protection electronics.
   7. Provide SFP that is compatible with cabling, power supply, and PoE extender. SFP shall be approved by Owner prior to procurement.

2.7 LAN EQUIPMENT

A. Ethernet Switch:
   1. Design Basis: Dell N2048P Switch.
   2. Switch shall have the following features:
      a. 48 Port 10/100/1000Mb auto-sensing ports.

b. Two integrated 10GbE SFP+ ports.
c. Two integrated hot-swappable power supplies.
d. Power over Ethernet+
e. Managed Ethernet Switch.
f. Provide fiber optic transceivers.

B. Security Desk Workstation:
1. Design Basis:
2. Workstation shall have the following features:
a. Meet recommended manufacturer's security desk workstation specifications.
b. Dual slot graphics cards
c. Intel Core i7 processor
d. 16GB RAM
e. Windows 10
f. SSD/Video Grade SATA
g. 5 year on-site warranty.

2.8 COPPER CABLE

A. Category Cable:
1. Refer to Division 27 Section “Horizontal Cable”

2.9 COPPER TERMINATION EQUIPMENT

A. Refer to Division 27 Section "Horizontal Cable"

2.10 SECURITY EQUIPMENT RACKS AND CABINETS

A. Refer to Division 27 "Communication Rooms Equipment Fittings"

PART 3 - EXECUTION

3.1 EXAMINATION

A. The Security Contractor shall maintain the integrity of the existing system through renovation. The Contractor shall coordinate any outages or down-time with the Owner prior to starting any work.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the EVS system.

C. Examine roughing-in for embedded and built-in anchors to verify actual locations of EVS connections before installation.

D. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of intrusion detection or access control.

E. Inspect built-in and cast-in anchor installations, before installing EVS, to verify that anchor installations comply with requirements.

F. Remove and replace anchors where inspections indicate that they do not comply with requirements. Reinspect after repairs or replacements are made.

G. Perform additional inspections to determine compliance of replaced or additional anchor installations.

H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SYSTEM INSTALLATION

A. Systems shall be complete and operational in all respects.

B. Contractor shall program and provision the system per the drawings and specifications and owner requirements.

C. Contractor shall coordinate with the Division 26 contractor regarding the installation of all conduit, raceways, cable trays, power, etc. for all building EVS Systems.

D. Connect 120 VAC emergency power to EVS Systems as required.

E. All security equipment, junction boxes, terminal cans, etc. shall be installed utilizing tamper proof mounting hardware. Provide a minimum of 2 driver bits or hand tools for each type of security fastener provided.

F. Provide seismic restraints for all equipment, including equipment racks, consoles, etc.

3.3 WIRING INSTALLATION

A. Wiring Method: Install wiring in raceways except in accessible indoor ceiling spaces and in interior hollow gypsum board partitions where cable may be used. Conceal raceways and wiring except in unfinished spaces and as indicated. Minimum conduit size shall be 3/4-inch. Security and data transmission wiring shall not share conduit with other building wiring systems.

B. Conductors: Size as recommended in writing by system manufacturer, unless otherwise indicated.

C. 120-V Power Wiring: Comply with Section "Low-Voltage Electrical Power Conductors and Cables".

D. Connections: Comply with torque-tightening values specified in UL 486A.

E. Install power supplies and other auxiliary components for cameras at head-end equipment, unless otherwise indicated or required by manufacturer. Do not install such items near devices they serve.

3.4 GROUNDING

A. Comply with Division 26 Section "Grounding and Bonding."

B. Comply with Division 27 Section “Telecommunications Grounding and Bonding.”

END OF SECTION