

PROJECT MANUAL FOR
FOOTBALL FIELD SCOREBOARD REPLACEMENT

CONSTRUCTION DOCUMENTS

Copiah-Lincoln Community College
H.F. McCarty Dr.
Wesson, MS 39191
January 22, 2020

VOLUME 1 OF 1



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WBA Project No. 7318

SET NO. _____

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Owner

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Architect

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Structural

LAIRD + SMITHERS, INC.
219 North Lamar Street | Jackson, MS 39201
P: 601.914.1547 | F: 601.352.0288 | chas.smithers@lairdsmithers.com
Chas Smithers, PE

Electrical

THE POWER SOURCE, PLLC
945 Madison Avenue | Madison, MS 39110
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Chris Green, PE

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ADVERTISEMENT FOR BIDS

Sealed bids for construction of the

Football Field Scoreboard Replacement – Copiah Lincoln Community College Wier Boerner Allin Project #7318

will be received by Copiah Lincoln Community College, Ewing Administration Building 1001 Co-Lin Dr. Wesson, MS 39191 until 2:00 p.m. Thursday February 20, 2020, and thereby publicly opened and read. Once contract proposal will include all work.

Contract Documents may be examined at Copiah Lincoln Community College, Ewing Administration Building 1001 Co-Lin Dr. Wesson, MS 39191 and as listed below.

Bids shall be submitted on the form to be furnished by the Architect and must be accompanied by bid bond or certified check for at least five percent (5%) of the base bid payable to Copiah Lincoln Community College. No bid may be withdrawn for 60 days after the actual date of the bid opening.

All bids must comply with applicable state laws of the State of Mississippi and shall include the Contractor's Certificate of Responsibility Number. A performance and payment bond for one hundred percent (100%) of the contract sum will be required of the successful bidder.

The Owner reserves the right to waive any and all informalities or to reject any or all bids submitted.

Contract Documents may be obtained for viewing and purchase at:

Jackson Blueprint: www.planroom.jaxblue.com.

Central Bidding: Official Contract Documents can be downloaded from Central Bidding at www.centralbidding.com. Electronic bids can be submitted at www.centralbidding.com. For any questions relating to the electronic bidding process, please call Central Bidding at 225-810-4814.

Complete set of contract documents, which also includes a downloadable pdf set, are available for a refundable check deposit of \$100.00 made payable to Wier Boerner Allin Architecture. Please place your order online. Checks are to be mailed or hand-delivered to Jackson Blueprint 299 Monroe Street, Jackson, MS 39202 to the attention of Paul Kennedy.

By: Dr. Jane Hulon
Copiah Lincoln Community College

Dates of Publication:
January 22, 2020
January 29, 2020

SECTION 00.2113
INSTRUCTIONS TO BIDDERS

SUMMARY

1.1 DOCUMENT INCLUDES

- A. Invitation
- B. Bid Documents and Contract Documents
- C. Site Assessment
- D. Qualifications
- E. Bid Submission
- F. Bid Enclosures/Requirements
- G. Offer Acceptance/Rejection

1.2 RELATED DOCUMENTS

- A. Document 00.1113 - Advertisement for Bids.
- B. Document 00.4100 - Bid Form.
- C. Document 00.7300 - Supplementary Conditions:

INVITATION

2.1 BID SUBMISSION

- A. Bids signed and under seal, executed, and dated will be received at the office of the Owner, Copiah Lincoln Community College at Ewing Administration Building, 1001 Co-Lin Dr. Wesson, MS 39191 before 2:00 p.m. local standard time on the 20th day of February.
- B. Offers submitted after the above time shall be returned to the bidder unopened.
- C. Offers will be opened publicly immediately after the time for receipt of bids.
- D. Amendments to the submitted offer will be permitted if received in writing prior to bid closing and if made on the Bid Proposal Form and included in the sealed envelope.
- E. Telegraphic Bid Modification and Modifications on the sealed envelope face will not be considered.

2.2 INTENT

- A. The intent of this Bid request is to obtain an offer to perform work to complete the Project as described in the Contract Documents for a Stipulated Sum contract, in accordance with the Contract Documents.

2.3 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

- A. Work of this proposed Contract comprises building construction, including general construction Work.

2.4 CONTRACT TIME

- A. Perform the Work in 105 calendar days.
- B. The bidder, in submitting an offer, accepts the Contract Time period stated for performing the Work. The completion date in the Agreement shall be the Contract Time added to the commencement date.

BID DOCUMENTS AND CONTRACT DOCUMENTS

3.1 DEFINITIONS

- A. Bid Documents: Contract Documents supplemented with Invitation To Bid, Instructions to Bidders, Information Available to Bidders, Bid Form Supplements To Bid Forms and Appendices identified.
- B. Contract Documents: Defined in AIA A201 Article 1 including issued Addenda.
- C. Bid, Offer, or Bidding: Act of submitting an offer under seal.

- D. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

3.2 CONTRACT DOCUMENTS IDENTIFICATION

- A. Contract Documents are identified as Project Number 7318, as prepared by Architect who is located at 2727 Old Canton Rd. Jackson, MS 39216, and with contents as identified in the Table of Contents.

3.3 AVAILABILITY

- A. Bid documents may be obtained at planroom.jaxblue.com and centralbidding.com. All interested bidders are required to have a valid email address for registration and ordering. Printing costs shall be the responsibility of the bidder..
- B. Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.
- C. Questions regarding website registration and online orders may be made by contacting Jackson Blue Print at (601) 353-5803 and Central Bidding at (225) 810-4814.
- D. Bid documents will be issued in complete sets only. No partial printings of specifications sections or trade specific drawings will be issued.

3.4 EXAMINATION

- A. Bid Documents may be viewed at the office of Owner.
- B. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.
- C. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

3.5 INQUIRIES/ADDENDA

- A. Direct questions to Julie Markle, email; jmarkle@wba.ms.
- B. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.
- C. Verbal answers are not binding on any party.
- D. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients.

3.6 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

- A. Substitutions will NOT be considered prior to submission of bids. Substitute products will only be considered as part of the submittal process of the awarded bidder.
- B. In considering substitutions to products specified, bidders shall include in their bid all changes required in the Work and changes to Contract Time and Contract Sum to accommodate such substitutions. A later claim by the bidder for an addition to the Contract Time or Contract Sum because of changes in work necessitated by use of substitutions shall not be considered.
- C. The submission shall provide sufficient information to determine acceptability of such products.
- D. Provide complete information on required revisions to other work to accommodate each proposed substitution.
- E. Provide products as specified unless substitutions are submitted in this manner and accepted.
- F. See Section 01.6000 - Product Requirements for additional requirements.

SITE ASSESSMENT

4.1 SITE EXAMINATION

- A. Examine the project site before submitting a bid.

INSTRUCTIONS TO BIDDERS

- B. The bidder is required to contact Owner at the following address and phone number in order to arrange a date and time to visit the project site: H.F.McCarty Dr. Wesson, MS 39191, (601) 643-8354.

4.2 PREBID CONFERENCE

- A. A bidders conference has been scheduled for 9:00 a.m. on the 6th day of February at the location of the Hospitality Room at the Football Field.
- B. All general contract bidders and suppliers are invited. Attendance by plan holders is strongly encouraged.
- C. Representatives of Architect will be in attendance.
- D. Summarized minutes of this meeting will be circulated to attendees. These minutes will not form part of Contract Documents.
- E. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients.

QUALIFICATIONS

5.1 CERTIFICATE OF RESPONSIBILITY NUMBER

- A. Each Contractor submitting a bid exceeding \$50,000.00 must show on his bid, and on the face of the envelope containing the bid, his Certificate of Responsibility Number, as required by General Laws of Mississippi 1985, and in accordance with Sections 25 43 1 through 25 43 19, Mississippi Code of 1972. If the bid does not exceed the above stated amounts, a notation so stating must appear on the face of the envelope.

BID SUBMISSION

6.1 SUBMISSION PROCEDURE

- A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
- B. Submit one copy of the executed offer on the Bid Forms provided, signed and sealed with the required security in a closed opaque envelope, clearly identified with bidder's name, project name and Owner's name on the outside.

BID ENCLOSURES/REQUIREMENTS

7.1 FORM

- A. Form: Make all Proposals on forms provided and fill all applicable blank spaces without interlineations, alteration or erasure and must not contain recapitulation of the work to be done. No oral, telegraphic, or telephone proposals will be considered. Any addenda issued during the bidding shall be noted on the Proposal Form.

7.2 SECURITY DEPOSIT

- A. Bids shall be accompanied by a security deposit as follows:
 - 1. Bid Bond or certified check of a sum no less than 5 percent of the Bid Amount on AIA A310 Bid Bond Form.
- B. Endorse the Bid Bond in the name of the Owner as obligee, signed and sealed by the principal (Contractor) and surety.
- C. The security deposit will be returned after delivery to the Owner of the required Performance and Payment Bond(s) by the accepted bidder.
- D. Include the cost of bid security in the Bid Amount.
- E. If no contract is awarded, all security deposits will be returned.

7.3 PERFORMANCE ASSURANCE

- A. Accepted Bidder: Provide a Performance bond as described in 00.7300 - Supplementary Conditions.

- B. Include the cost of performance assurance bonds in the Bid Amount.

7.4 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form and Appendices.

7.5 BID MODIFICATIONS

- A. Modification of Bid on face of sealed envelope will not be considered and only those figures written on the Bid Proposal Form will be valid.
- B. Telegraphic Bid Modification will not be allowed.

7.6 ADDITIONAL BID INFORMATION

- A. The lowest bidder will be requested to complete the Supplements To Bid Forms within 24 hours after submission of bids including financing information as outlined in section 01.2000.

OFFER ACCEPTANCE/REJECTION

8.1 DURATION OF OFFER

- A. Bids shall remain open to acceptance and shall be irrevocable for a period of sixty (60) days after the bid closing date.

8.2 ACCEPTANCE OF OFFER

- A. Contract will be awarded on the basis of the best bid received based on Owner's and Architect's evaluation of the bid, prior performance of bidder and it's proposed subcontractor and suppliers. The Owner reserves the right to award based on the Owner's evaluation of the bid. The Owner reserves the right to waive irregularities and to reject any and/or all bids.
- B. The Owner shall have the right to accept alternates in any order or combination and to determine the successful Bidder on the basis of the alternates accepted.

8.3 SECURITY FOR FAITHFUL PERFORMANCE

- A. Simultaneously with his delivery of the Executed Contract, the Contractor shall furnish a surety bond as security for faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract. The surety on such bond or bonds shall be a duly authorized surety company, satisfactory to the Owner.

8.4 LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

- A. The successful Bidder, upon his failure or refusal to execute and deliver the contract, bond, and insurance required within ten (10) days after he has received notice of acceptance of his bid, shall forfeit to the Owner as liquidated damages, the security deposited with his bid.

END OF SECTION

THE PROJECT AND THE PARTIES

1.1 TO:

- A. Owner
1. Copenh-Lincoln Community College

1.2 FOR:

- A. Project: Copenh Football Field Scoreboard Replacement

1.3 DATE: _____ (BIDDER TO ENTER DATE)

1.4 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

- A. Bidder's Full Name _____
1. Address _____
2. City, State, Zip _____

1.5 OFFER

- A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Bid Documents prepared by Wier Boerner Allin Architecture, PLLC. for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Unit Prices listed in this bid form for the Sum of:

- B. _____ dollars (\$ _____), in
lawful money of the United States of America.

- C. We have included the required security deposit as required by the Instruction to Bidders.
D. We have included the required performance assurance bonds in the Bid Amount as required by the Instructions to Bidders.
E. All applicable federal taxes are included and State of Mississippi taxes are included in the Bid Sum.
F. All Cash and Contingency Allowances described in Section 01.2100 - Allowances are included in the Bid Sum.

1.6 ACCEPTANCE

- A. This offer shall be open to acceptance and is irrevocable for thirty days from the bid closing date.
B. If this bid is accepted by Owner within the time period stated above, we will:
1. Execute the Agreement within seven days of receipt of Notice of Award.
2. Furnish the required bonds within seven days of receipt of Notice of Award.
3. Commence work within seven days after written Notice to Proceed of this bid.
C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.
D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.7 CONTRACT TIME

- A. If this Bid is accepted, we will:
B. Complete the Work as follows: _____
1. In 105 calendar days from Notice to Proceed.

1.8 ADDENDA

- A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
1. Addendum # _____ Dated _____.
 2. Addendum # _____ Dated _____.
 3. Addendum # _____ Dated _____.
 4. Addendum # _____ Dated _____.

1.9 BID FORM SUPPLEMENTS

- A. We agree to submit the following Supplements to Bid Forms within 24 hours after submission of this bid for additional bid information:
1. Financing Information as required in Section 01.2000, Paragraph 1.7.

1.10 BID FORM SIGNATURE(S)

- A. The Corporate Seal of
- B. _____
- C. (Bidder - print the full name of your firm)
- D. was hereunto affixed in the presence of:
- E. _____
- F. (Authorized signing officer, Title)
- G. (Seal)
- H. _____
- I. (Authorized signing officer, Title)

1.11 IF THE BID IS A JOINT VENTURE OR PARTNERSHIP, ADD ADDITIONAL FORMS OF EXECUTION FOR EACH MEMBER OF THE JOINT VENTURE IN THE APPROPRIATE FORM OR FORMS AS ABOVE.

END OF SECTION

CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.1 CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.2 AGREEMENT AND CONDITIONS OF THE CONTRACT

- A. See Section 00.7200 - General Conditions for the General Conditions.
- B. See Section 00.7300 - Supplementary Conditions for the Supplementary Conditions.
- C. The Agreement is based on AIA A101.
- D. The General Conditions are based on AIA A201.

1.3 FORMS

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.
- B. Bond Forms:
 - 1. Performance and Payment Bond Form: AIA A312.
- C. Post-Award Certificates and Other Forms:
 - 1. Certificate of Insurance Form: ACORD Certificate of Insurance 25.
 - 2. Schedule of Values Form: AIA G703.
 - 3. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).
- D. Clarification and Modification Forms:
 - 1. Construction Change Directive Form: AIA G714.
 - 2. Change Order Form: AIA G701.
- E. Closeout Forms:
 - 1. Certificate of Substantial Completion Form: AIA G704.
 - 2. Affidavit of Payment of Debts and Claims Form: AIA G706.
 - 3. Affidavit of Release of Liens Form: AIA G706A.
 - 4. Consent of Surety to Final Payment Form: AIA G707.

1.4 REFERENCE STANDARDS

- A. AIA A101 - Standard Form of Agreement Between Owner and Contractor where the basis of Payment is a Stipulated Sum; 2007.
- B. AIA A201 - General Conditions of the Contract for Construction; 2007.
- C. AIA A312 - Performance Bond and Payment Bond; 2010.
- D. AIA G701 - Change Order; 2001.
- E. AIA G702 - Application and Certificate for Payment; 1992.
- F. AIA G703 - Continuation Sheet; 1992.
- G. AIA G704 - Certificate of Substantial Completion; 2000.
- H. AIA G714 - Construction Change Directive; 2007.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 00.6000

BONDS AND CERTIFICATES

PART 1 - GENERAL

1.1 PERFORMANCE AND PAYMENT BONDS

- A. Performance and Payment Bonds shall be AIA Document A312 (two parts) Performance Bond and Labor and Material Payment Bond, December 1984, Third Printing March 1987 edition.

1.2 CERTIFICATES OF INSURANCE

- A. See Section 00.7300 Supplemental Conditions for requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF BONDS AND CERTIFICATES

SECTION 00.7200
GENERAL CONDITIONS

PART 1 - GENERAL

1.1 FORM OF GENERAL CONDITIONS

- A. Conditions of the Contract for Construction," AIA Document A201, 2007 Edition, is a part of this Contract exactly as though fully-written and incorporated herein.
- B. THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS NOT ATTACHED FOLLOWING THIS PAGE.
- C. All Contractors bidding this project are presumed to be familiar with this Document. Contractors may examine a copy of this Document in the Architect's office upon receipt of written request.

1.2 RELATED REQUIREMENTS

- A. SECTION 00.7300 - Supplementary Conditions.
- B. SECTION 01.4216 - Definitions.

1.3 SUPPLEMENTARY CONDITIONS

- A. REFER TO DOCUMENT 00.7300 - Supplementary Conditions FOR AMENDMENTS TO THESE GENERAL CONDITIONS.

END OF SECTION

SECTION 00.7300

SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

1.1 SUMMARY

- A. These Supplementary Conditions amend and supplement the General Conditions defined in Document 00.7200 - General Conditions and other provisions of the Contract Documents as indicated below. Provisions that are not so amended or supplemented remain in full force and effect.
- B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

1.2 RELATED SECTIONS

- A. Section 00.5000 - Contracting Forms and Supplements.
- B. Section 01.4216 - Definitions.

1.3 MODIFICATIONS TO GENERAL CONDITIONS

A. ARTICLE 1 - GENERAL DEFINITIONS

1. Paragraph 1.1 - BASIC DEFINITIONS

- a. Delete the last sentence of Subparagraph 1.1.1 and substitute the following sentence:
 - 1) The Contract documents include the Advertisement for Bids, Instructions to Bidders Proposal Form sample forms and all portions of addenda issued prior to execution of the contract.
- b. Add the following new sentence at the end of Subparagraph 1.1.7:
 - 1) This paragraph in no way supersedes the Owner's documents right set forth in the agreement between the Owner and the Professional.

B. ARTICLE 2 - OWNER

1. Paragraph 2.1 GENERAL

- a. Add a new subparagraph as follows:
 - 1) 2.1.3 - The Owner as used in these documents, refers to INSERT OWNER NAME, for which the work under this contract is being used.
- 2. Paragraph 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER
 - a. Change Subparagraph 2.2.5 to read as follows:
 - 1) 2.2.5 - Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one digital copy of the Contract Documents for purposed of making reproductions pursuant to Section 1.5.2.

C. ARTICLE 3 - CONTRACTOR

1. Paragraph 3.18 - INDEMNIFICATION

- a. Add a new subparagraph as follows:
 - 1) 3.18.3 - The contractor agrees to defend, hold harmless and indemnify the Owner against all claims or demands originating under this contract by subcontractors, material men, or other entities situated similarly.

D. ARTICLE 4 - ARCHITECT

1. Paragraph 4.1 GENERAL

- a. Add a new subparagraph as follows:
 - 1) 4.1.4 - *The term "Architect", "Engineer", or "Professional" as used in these documents refers to the Professional firm indicated in Paragraph 5.3 of the Standard Form of Agreement Between the Owner and the Contractor who has been directed by the Owner to design and observe construction of this Project.*

E. ARTICLE 5 - SUBCONTRACTORS

- 1. No supplementary conditions

F. ARTICLE 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

- 1. No supplementary conditions

G. ARTICLE 7 - CHANGES IN THE WORK

1. **Paragraph 7.2 CHANGE ORDERS**

a. Add the new subparagraphs as follows:

- 1) 7.2.2 - Adjustments to the Contract Sum by change order may be based upon one of the methods set forth in Article 7.3.3.1, 7.3.3.2, 7.3.3.3 or 7.3.3.4, as appropriate. A reasonable allowance for the combined overhead and profit included in the change order shall be based upon the schedule set forth in Article 7.3.11, as supplemented.
- 2) 7.2.3 - Contractor's execution of a change order constitutes a final settlement to the Contract Sum and construction schedule and the Contract Time for all matters relating to or arising out of the change in the Work that is the subject of the change order including, but not limited to, all direct and indirect costs associated with such change, all extended direct job site and home office overhead expenses and any and all delay and impact cost for the change, whether alone or in combination with other changes, including any impact, ripple or cumulative effect resulting there from, if any.
- 3) 7.2.4 - In order to facilitate consideration of change order request, all such requests, except those involving an amount less than \$500 must be accompanied by a complete itemization of costs, including labor, materials and subcontractor costs which shall likewise be itemized. Changes for more than \$500 will not be approved without such itemization.

2. **Paragraph 7.3 CONSTRUCTION CHANGE DIRECTIVES**

a. Delete the first sentence of Subparagraph 7.3.8 and insert the following:

- 1) The amount of credit to be given by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be the actual net approved by the Architect and Owner.

b. Add the new subparagraphs as follows:

- 1) 7.3.11 - *The allowance for overhead and profit combined, including extended direct job and home office overhead and any and all delay, impact, inefficiency, disruption and ripple effect to be included in the total cost to the Owner, shall be based on the following schedule:*
 - (a) For the Contractor, for work performed by the Contractor's own forces, 15 percent of the cost.
 - (b) For the Contractor, for work performed by the Contractor's subcontractor, 10 percent of the amount due the subcontractor.
 - (c) For each subcontractor or sub-subcontractor involved, for work performed by that subcontractor or sub-subcontractor's own forces, 15 percent of the cost.
 - (d) For each subcontractor, for work performed by the subcontractor's sub-subcontractor's, 10 percent of the amount due the sub-subcontractor.
 - (e) Costs to which overhead and profit is to be applied shall be determined in accordance with Article 7.3.7.
- 2) 7.3.12 - If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

H. ARTICLE 8 - TIME

1. **Paragraph 8.1 DEFINITIONS**

a. Change Subparagraph 8.1.3 to read as follows:

- 1) The date of substantial completion is the date certified by the Architect and approved by the Owner in accordance with Paragraph 9.8 entitled "Substantial Completion".

2. **Paragraph 8.3 DELAYS AND EXTENSIONS OF TIME**

a. Change Subparagraph 8.3.1 to read as follows:

- 1) If the Contractor is delayed at any time in the commencement or progress of the Work by any act of neglect of the Owner or the Architect, or by any employee of either, or by changes

SUPPLEMENTARY CONDITIONS

ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or any causes beyond the Contractor's control, or by any other causes which the Architect determines may justify the delay, then the Contract Time may be extended by Change Order for such reasonable time as the Architect may determine, subject to the Owner's approval. Any claim for loss or any delay occasioned by any separate Contractor, or Subcontractor, shall be settled between the Contractor and such other separate Contractor, or Subcontractors.

I. ARTICLE 9 - PAYMENTS AND COMPLETION

1. Paragraph 8.3 APPLICATIONS FOR PAYMENT

- a. Add a new sentence to the end of Subparagraph 9.3.1:
 - 1) The form of Application for Payment will be AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet, or a computer generated form containing similar data.
- b. Add a new Clause to Subparagraph 9.3.1 as follows:
 - 1) 9.3.1.3 - The Contractor must submit each month with this Application for Payment a separate letter stating that he is requesting an extension of time or that he had no need for and extension for that period of time. No payment on a monthly application will be made until the letter is received. Complete justification such as weather reports or other pertinent correspondence must be included for each day's request for extension. A Contractor's letter, or statement, will not be considered as adequate justification. The receipt of this request and data by the Owner will not be considered as Owner approval in any way.
- c. Add a new Subparagraph as follows:
 - 1) 9.3.4 - In any contract awarded by the State of Mississippi or any agency, unit of department of the State of Mississippi or by any political subdivision thereof, the amount of retainage that may be withheld is governed by Mississippi law. At any point where law allows for the reduction of retainage, the application for payment requesting such reduction shall be accompanied by appropriate certification of reduction by the Contractor's surety.

2. Paragraph 9.6 PROGRESS PAYMENTS

- a. Add the new subparagraphs as follows:
 - 1) 9.6.9 - *The amount retained by the contractor from each payment to each Subcontractor and material supplier will not exceed the percentage retained by the Owner from the Contractor.*

3. Paragraph 9.7 FAILURE OF PAYMENT

- a. Change Subparagraph 9.7.1 to read as follows:
 - 1) The Contractor and the Owner shall be subject to the remedies as prescribed in Section 31-58-25 of the Mississippi Code 1972, Annotated.

4. Paragraph 9.8 SUBSTANTIAL COMPLETION

- a. Add a new sentence at the end of Subparagraph 9.8.4:
 - 1) Substantial Completion shall not be established and final until the Owner approves the Architect's Certificate of Substantial Completion.

5. Paragraph 9.11 LIQUIDATED DAMAGES

- a. Add Paragraph 9.11 and all subparagraphs and clauses as follows:
 - 1) 9.11 Liquidated Damages
 - 2) 9.11.1 - Time being of the essence and a matter of material consideration thereof, a reasonable estimate in advances is established to cover losses incurred by the Owner if the project is not substantially complete on the date set forth in Contract Documents. The contractor and his Surety will be liable for and will pay the Owner the sums hereinafter stipulated as fixed and agreed as liquidated damages for each calendar day of delay until the Work is substantially complete. Amount of liquidated damages per day is as follows: [Five Hundred] dollars (\$500). Contractor agrees to complete all incomplete items within thirty days after date of Certificate of Substantial Completion.
 - 3) 9.11.2 - Furnish to the Owner a Signed and Notarized affidavit stating that the Contractor understands and agrees to pay Owner Liquidated damages in amount herein stated and attached to executed Owner and Contractor's Agreements.

- 4) 9.11.3 - Architectural additional services required by circumstances caused by the Contractor or Subcontractors shall be invoiced to the Owner. These costs may be passed on and charged to the Contractor by the Owner. Potential additional architectural services shall be defined as follows:
 - (a) Reviews of Submittals beyond two reviews.
 - (b) Visits to the site for Construction Administration Services beyond the Contract time and any approved extensions.
 - (c) Reviews of any portion of the work to determine if said portion is substantially complete in accordance with the requirements of the Contract Documents beyond two.
 - (d) Reviews of work or inspections for any portion of the work to determine final completion beyond two.
 - (e) Responses to the Contractor's request for information where such information is available to the Contractor from a careful study and comparison, of the Contract Documents.
 - (f) Change Orders requiring evaluation of proposals, including preparation or revision of the Instruments of Service.
 - (g) Providing consultation concerning replacement of Work resulting from fire or incorrect work by the Contractor or other causes during construction.
 - (h) Evaluation of substitutions proposed by the Contractor after 30 days past Notice to Proceed and making subsequent revisions to Instruments of Service resulting therefrom.
 - (i) Contract Administration Services provided after the date of Substantial Completion.

J. ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

1. Paragraph 10.2 SAFETY OF PERSONS AND PROPERTY

a. Change Subparagraph 10.2.5 to read as follows:

- 1) The Contractor shall promptly remedy damages and loss (other than damages or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible for Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.

K. ARTICLE 11 - INSURANCE AND BONDS

1. Paragraph 11.1 CONTRACTOR'S LIABILITY INSURANCE

a. Add the new subparagraphs as follows:

- 1) *11.1.5 - The Contractor's limit of liability shall be written for not less than the following:*

(a) *GENERAL LIABILITY:*

- (1) Commercial General Liability (Including XCU)
- (2) *General Aggregate* \$ 1,000,000.00
- (3) *Product & Completed Operation Aggregate* \$ 1,000,000.00
- (4) *Personal & Advertising Injury* \$ 500,000.00 Per Occurrence
- (5) *Bodily Injury & Property Damages Occurrence* \$ 500,000.00 Per Occurrence
- (6) *Fire Damage Liability Occurrence* \$ 50,000.00 Per Occurrence
- (7) *Medical Expense* \$ 5,000.00 Per Occurrence
- (8)

(b) *OWNER & CONTRACTORS PROTECTIVE LIABILITY*

- (1) *Bodily Injury & Property Damages Aggregate* \$ 1,000,000.00

SUPPLEMENTARY CONDITIONS

- (2) *Bodily Injury & Property Damages Occurrence* \$ 500,000.00 Per
 - (3)
 - (c) **AUTOMOBILE LIABILITY:**
 - (1) Owned, Non-owner & Hired Vehicles
 - (2) Contractor Insurance Option Number 1(Combined Single Limit):
 - (3) *Bodily Injury & Property Damages Occurrence* \$ 500,000.00 Per
 - (4) *Combined Single Limit*
 - (5) Contractor Insurance Option Number 2:
 - (6) *Bodily Injury* \$ 250,000.00 Per Occurrence
 - (7) *Bodily Injury* \$ 500,000.00 Per Accident
 - (8) *Property Damage* \$ 100,000.00 Per Occurrence
 - (9)
 - (d) **EXCESS LIABILITY:**
 - (1) *Umbrella on Projects over \$500,000.00*
 - (2) *Bodily Injury & Property Damages Occurrence* \$ 1,000,000.00 Per
 - (3) *Combined Single Limit*
 - (4)
 - (e) **WORKERS' COMPENSATION: As required by Statute**
 - (1) EMPLOYERS' LIABILITY
 - (2) *Accident Occurrence* \$ 100,000.00 Per
 - (3) *Disease Limit* \$ 500,000.00 Policy
 - (4) *Disease Occurrence* \$ 100,000.00 Per
 - (5)
 - (f) **PROPERTY INSURANCE:**
 - (1) *Builder's Risk* \$ Equal to Value of Work
 - (2) *or Installation Floater Work* \$ Equal to Value of Work
 - 2) 11.1.6 - *Furnish one (1) copy of the Standard Construction Contract Certificate of Insurance Form for each copy of the Standard Form of Agreement Between Owner and Contractor specifically setting forth evidence of all coverage required by Subparagraphs 11.1.1, 11.1.2 and 11.1.3. Furnish to the Owner copies of any endorsements that are subsequently issued amending limits of coverage.*
 - 3) 11.1.7 - If the coverage are provided on a claims-made basis, the policy date or retroactive date shall predate the Contract; the terminations date, or the policy, or applicable extended reporting period shall be no earlier than the termination date of coverage required to be maintained after final payment.
2. **Paragraph 11.2 OWNER'S LIABILITY INSURANCE**
- a. Delete Subparagraph 11.2.1 its entirety and substitute the following:
 - 1) 11.2.1 - *Certificate of this insurance will be filed with the Owner and will be the same limits set forth in 11.1.5.*
3. **Paragraph 11.3 PROPERTY INSURANCE (BUILDER'S RISK OR INSTALLATION FLOATER)**
- a. Change the first line in Subparagraph 11.3.1 to read as follows:
 - 1) Unless otherwise provided, the Contractor shall purchase.....
 - b. Delete Clause 11.3.1.2 under Subparagraph 11.3.1 in its entirety.
 - c. Change Subparagraph 11.3.1.3 to read as follows:

- 1) If the property insurance requires deductibles, the Contractor shall pay cost not covered because of such deductibles.
 - d. Delete Subparagraph 11.3.2 in its entirety.
 - e. Delete Subparagraph 11.3.3 in its entirety.
 - f. Delete Subparagraph 11.3.4 in its entirety.
 - g. Delete Subparagraph 11.3.5 in its entirety.
 - h. Delete Subparagraph 11.3.6 in its entirety.
 - i. Change Subparagraph 11.3.10 to read as follows:
 - 1) The Owner as fiduciary shall have power to adjust and settle a loss with Insurers unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss.
- L. ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK
1. No supplementary conditions.
 - a.
- M. ARTICLE 13 - MISCELLANEOUS PROVISIONS
1. No supplementary conditions.
 - a.
- N. ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT
1. No supplementary conditions.
 - a.
- O. ARTICLE 15 - CLAIMS AND DISPUTES
1. Paragraph 15.1 CLAIMS
 - a. Add a new Clause to Subparagraph 15.1.5 as follows:
 - 1) 15.1.5.3 - *Contractor shall submit to the Architect each month, with Contractor's Application for Payment , a request for an extension of time for adverse weather days each month for number of days exceeding the normal anticipated weather delay days listed below:*
 - 2) MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
11	9	10	8	9	9	10	11	8	7	9	10
 - 3) The table above defines the monthly anticipated adverse weather for the contract period and is based upon NOAA or similar data for the geographic location of the project.
 - 4) The above table constitutes the base line for monthly (or portion thereof) adverse weather evaluations. Actual adverse weather days are to be recorded on a calendar day basis, including weekends and holidays, and compared to the monthly anticipated adverse weather at the end of each month. Once the number of factual adverse weather days anticipated in the table above have been incurred, the Architect will examine any subsequently occurring adverse weather days to determine whether or not the Contractor is entitled to a time extension. These subsequently occurring adverse weather days must prevent work for 50% or more of the Contractor's workday and must delay work critical to the timely completion of the project in order to qualify for an extension of time.
 - 5) If Contractor has not been delayed by adverse weather conditions, then, state in writing that no weather days are required. Application for Payment shall be returned without letter regarding Adverse Weather.
 - 6) Additionally, submit Contractor's Daily Log each month, with Contractor's Application for payment, for each day of the month along with other Supporting Data consisting of the following:
 - (a) Record adverse conditions that hinder the Work for more than 50% of the work day.
 - (b) Time of day work activities was stopped.
 - (c) Work in progress. If work in progress is not delayed by the weather, then no weather days will be allowed .

SUPPLEMENTARY CONDITIONS

- (d) Number of hours work was stopped for each work day.
- (e) Trades and number of workmen for each trade.
- (f) Record weather conditions each Calendar of each month and submit copy with application of Payment each month.
- (g) Report from the national weather bureau, Radio Station or television Station serving the local area of the construction to establish weather condition.
- (h) Reporting shall run concurrently with Application for payment period.

END OF SECTION

SECTION 00.9100
BIDDING ADDENDUM

PART 1 - GENERAL

1.1 ADDENDA

- A. Any Addendum issued prior to bid date on this Project will be included in Section 00.9100 and become a part of the Standard Form of Agreement Between the Owner and the Contractor.
- B. Acknowledge receipt of All Addenda in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

PART 2 PRODUCTS - NOT USED

PART 3 - EXECUTION (NOT USED)

END OF DOCUMENT

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: Co-Lin Football Field Scoreboard Replacement
- B. Owner's Name: Copiah Lincoln Community College.
- C. Architect's Name: Wier Boerner Allin Architecture.
- D. The Project consists of the installation of a new scoreboard on the grassed area Southwest of the football field.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00.5000 Contracting Forms and Supplements.
- B. The scope of work of the prime contract is identified in this section, the Project Specifications and on the Drawings.

1.3 OWNER OCCUPANCY

- A. Owner intends to utilize 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.

1.4 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings. Do not disturb portions of the project site beyond areas in which the Work is indicated.
- B. Arrange use of site and premises to allow:
 - 1. Minimize space and time requirements for storage of materials and equipment on-site.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Do not obstruct roadways, sidewalks, or other public ways without permit.
 - 2. Keep driveways, loading areas, and entrances clear and available to the Owner at all times. Schedule deliveries to minimize use of driveways and entrances.
- D. Existing building spaces may not be used for storage.
- E. Time Restrictions:
 - 1. Limit conduct of especially noisy exterior work to the hours of 7am to 8pm.
 - 2. Weekend, Early and After hours Work shall be subject to the approval of the Owner and regulation by authorities having jurisdiction..
- F. Utility Outages and Shutdown:
 - 1. Limit shutdown of utility services to 8 hours at a time, arranged at least 48 hours in advance with Owner.
 - 2. Prevent accidental disruption of utility services to other facilities.

1.5 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner.
- B. Coordinate construction schedule and operations with Architect.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01.2000

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

- A. Section 00.5000 - Contracting Forms and Supplements: Forms to be used.
- B. Section 01.2100 - Allowances: Payment procedures relating to allowances.

1.3 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Submit Schedule of Values within 15 days after date of Owner-Contractor Agreement and no later than 10 days before the date scheduled for the submission of the initial Application for Payment.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization, bonds and insurance, and indirect costs as separate line items..
 - 1. Include separate line items for field supervision, layout, temporary facilities and controls and closeout documents.
 - 2. Include separate line items to the amount of Allowances specified in this section.
 - 3. For each specification section, include separate line items for labor, material and material stored off-site.
 - 4. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
 - 5. Where work is separated into phases, include a line item per phase for each specification section.
 - 6. Revise schedule to list approved Change Orders, with each Application For Payment.
- D. Review and Re-submittal: Schedule of Values are subject to review and approval of the Architect. If revisions are requested, the Contractor shall resubmit the adjusted Schedule of Values prior to the submission of the initial Application for Payment.

1.4 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Execute certification by signature of authorized officer and notarization.
- D. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- E. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work. Change Order line items do not need to be broken out to show separate material and labor costs.
- F. Submit three hard copies of each Application for Payment. Submit additional copies as required by the Owner and/or the Owner's Lending agent.
- G. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 01.3000.
 - 2. Construction progress schedule, revised and current as specified in Section 01.3000.
 - 3. Partial release of liens from major Subcontractors and vendors. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Affidavits attesting to off-site stored products.

1.5 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 8 days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01.6000.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
- F. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- J. Promptly enter changes in Project Record Documents.

1.6 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Attach to Application for Final Payment the specified supporting documents as specified in Section 01.7800.

PRICE AND PAYMENT PROCEDURES

- C. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01.7000.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01.2100 **ALLOWANCES**

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED REQUIREMENTS

- A. Section 01.2000 - Price and Payment Procedures: Additional payment and modification procedures.

1.3 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, including product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing, less applicable trade discounts, less Overhead, Profit, Bond and Insurance costs associated with cash allowances. Overhead, Profit, Bond and Insurance costs shall be included in Base Bid costs in addition to the related cash allowances..
- B. Architect Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order at Project Closeout to adjust Contract Sum for un-used allowance amounts.
- C. Contractor Responsibilities:
 - 1. Assist Architect in selection of products, suppliers, and installers.
 - 2. Advise the Architect of dates when final selection and purchase associated with allowances must be completed to avoid delay of work.
 - 3. Obtain proposals from suppliers and installers and offer recommendations.
 - 4. Submit proposals for Architect's review and approval prior to purchase.
 - 5. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 6. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 7. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
 - 8. At the direction of the Architect, return unused materials to manufacturer or supplier for credit, prepare unused materials for storage by Owner, or dispose of unused materials at the Contractor's expense.
- D. Differences in costs will be adjusted by Change Order prior to closeout.

1.4 CONTINGENCY ALLOWANCE

- A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- B. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.5 ALLOWANCES SCHEDULE

- A. Contingency Allowance: Include the stipulated sum/price of \$15,000 for use upon Architect's and/or Owner's instructions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01.3000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Coordination drawings.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Submittal procedures.

1.2 RELATED REQUIREMENTS

- A. Section 00.7200 - General Conditions: Dates for applications for payment.
- B. Section 01.3216 - Construction Progress Schedule: Form, content, and administration of schedules.
- C. Section 01.7000 - Execution and Closeout Requirements: Additional coordination requirements.
- D. Section 01.7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.3 PROJECT COORDINATOR

- A. Project Coordinator: Contractor's Superintendent or Project Manager. The Contractor shall designate one individual as Project Coordinator and submit their qualifications to the Architect in writing prior to the start of Contract Work. The Project Coordinator shall not be changed during construction without the written consent of the Architect.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for Owner access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01.1000 - Summary.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Manufacturer's instructions and field reports.
 - 6. Applications for payment and change order requests.
 - 7. Progress schedules.
 - 8. Coordination drawings.
 - 9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. Architect will schedule and administer a meeting after Notice of Award and prior to the commencement of the work.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor, including Project Coordinator and Superintendent (if not the Project Coordinator).
 - 4. Architect's Consultants.
 - 5. Major Subcontractors.
 - 6. Governmental or Regulatory agency representatives as required.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Designation of personnel representing the parties to Contract and Architect.
 - 5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 6. Scheduling.
 - 7. Use of premises by Owner and Contractor.
 - 8. Owner's requirements and occupancy prior to completion.
 - 9. Construction Facilities and controls provided by Owner.
 - 10. Temporary Utility provisions.
 - 11. Security and housekeeping procedures.
 - 12. Procedures for testing.

3.2 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals. Owner, Architect or Contractor may cancel a meeting if deemed necessary by mutual agreement of all parties.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Location: Contractor's field office unless otherwise agreed.
- D. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- E. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.

ADMINISTRATIVE REQUIREMENTS

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.
- F. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.3 CONSTRUCTION PROGRESS SCHEDULE

- A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- B. Within 10 days after joint review, submit complete schedule.
- C. Submit updated schedule with each Application for Payment.

3.4 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

3.5 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection. Submit all samples within 30 days after the Notice to Proceed.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01.7800 - Closeout Submittals.

3.6 SUBMITTALS FOR INFORMATION

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

3.7 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01.7800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.

5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.8 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Extra Copies at Project Closeout: See Section 01.7800.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor.

3.9 SUBMITTAL PROCEDURES

- A. General Requirements:
- B. 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. Submittals that do not include the Contractor's stamp will be rejected.
- C. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- D. Color schedules will be prepared by the Architect, and corresponding submittals for review after the Contractor has furnished all necessary color and finish samples.
- E. Incomplete submittals will be rejected.

END OF SECTION

SECTION 01.3216

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

- A. Section 01.1000 - Summary: Work sequence.

1.3 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; O'Brien; 2006.

1.4 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit proposed complete schedule for review.
- D. Submit updated schedule with each Application for Payment.

1.5 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

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

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- E. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- F. Coordinate content with schedule of values specified in Section 01.2000 - Price and Payment Procedures.
- G. Provide legend for symbols and abbreviations used.

3.3 BAR CHARTS

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

3.4 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.

3.6 DISTRIBUTION OF SCHEDULE

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

END OF SECTION

SECTION 01.4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals.
- B. Testing and inspection agencies and services.
- C. Control of installation.
- D. Mock-ups.
- E. Tolerances.
- F. Manufacturers' field services.
- G. Defect Assessment.

1.2 RELATED REQUIREMENTS

- A. Document 00.7200 - General Conditions: Inspections and approvals required by public authorities.
- B. Section 01.3000 - Administrative Requirements: Submittal procedures.
- C. Section 01.4216 - Definitions.
- D. Section 01.4219 - Reference Standards.
- E. Section 01.6000 - Product Requirements: Requirements for material and product quality.

1.3 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).
- B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.

1.4 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing. The selection of this testing agency is subject to the approval of the Architect.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
 - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
 - 2. Laboratory: Authorized to operate in the State in which the Project is located.
 - 3. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

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

3.2 MOCK-UPS

- A. Mock-up Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.
- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.3 PRE-INSTALLATION MEETINGS

- A. Schedule and conduct pre-installation meetings under provisions identified in this section and identified in the respective product specification sections.
- B. Schedule meetings a minimum of one (1) week prior to commencing the work of the trade, subcontractor or product.
- C. Require attendance of parties directly affected by the applicable work, including but not limited to the manufacturer's observer, project superintendent, subcontractor's foreman and skilled laborers who will be directly involved in the installation of the work.
- D. Review specifications requirements, workmanship and quality standards, tolerances, site conditions involving preparation and installation procedures, scheduling, coordination with related work and regulatory inspections/approvals.

3.4 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.

3.5 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.

QUALITY REQUIREMENTS

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

3.6 MANUFACTURERS' FIELD SERVICES

- 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 as applicable, and to initiate instructions when necessary.
- B. Qualifications of observer:
 - 1. Full-time employee of Manufacturer
 - 2. Fully-knowledgeable of applicable codes, manufacturer's specified products and installation requirements for each
 - 3. Authorized to represent Manufacturer in all field discussions necessary to validate warranty
- C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.7 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.

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

END OF SECTION

SECTION 01.4216

DEFINITIONS

PART 1 GENERAL

1.1 SUMMARY

- A. This section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

1.2 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Provide: To furnish and install, complete and ready for intended use.
- F. Supply: Same as Furnish.
- G. Installer: Contractor or another entity engaged by the Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01.4219
REFERENCE STANDARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements relating to referenced standards.

1.2 RELATED REQUIREMENTS

- A. Document 00.7200 - General Conditions: Reference standards.

1.3 QUALITY ASSURANCE

- A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with the reference standard of date of issue specified in this section, except where a specific date is established by applicable code.
- C. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- D. Conformance to applicable laws and codes takes precedence over the requirements of all other reference standards.
- E. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01.5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.

1.3 TELECOMMUNICATIONS SERVICES

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

1.4 TEMPORARY SANITARY FACILITIES

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

1.5 BARRIERS

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

1.6 FENCING

- A. Existing fence around perimeter of football field and stands may be used; secure area with vehicular and pedestrian gates if none exist.

1.7 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Coordinate parking for construction personnel with Owner's requirements.

1.8 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.

- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.9 PROJECT IDENTIFICATION

- A. The Contractor shall provide, install and maintain a project sign consisting of one sheet of 4'x8'x3/4" exterior grade plywood and all necessary supports and bracing. All exposed surfaces shall be painted per the Architect's instructions. Sign graphic shall be a full-sized self-adhered vinyl overlay. All content shall be approved by the Architect and Owner. The Architect shall furnish the Contractor with an electronic digital file of the sign content upon request.
- B. No other signs are allowed without Owner permission except those required by law.

1.10 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Location of office to be approved by the Owner and Contractor.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 600 mm (2 feet). Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01.6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 RELATED REQUIREMENTS

- A. Section 01.1000 - Summary: Lists of products to be removed from existing building.
- B. Section 01.2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 01.4000 - Quality Requirements: Product quality monitoring.
- D. Section 01.6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- E. Section 01.7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.3 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01.6116.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01.6116.

2.3 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Equal Substitutions: Submit a request for substitution for any manufacturer not named.

2.4 MAINTENANCE MATERIALS

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

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. See Section 01.2500 - Substitution Procedures.

3.2 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.3 STORAGE AND PROTECTION

- 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. See Section 01.7419.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

PRODUCT REQUIREMENTS

- E. For exterior storage of fabricated products, place on sloped 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 manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- J. Prevent contact with material that may cause corrosion, discoloration, or staining.
- K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- L. 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

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- J. General requirements for maintenance service.

1.2 RELATED REQUIREMENTS

- A. Section 01.1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01.3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01.4000 - Quality Requirements: Testing and inspection procedures.
- D. Section 01.5000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- E. Section 01.5000 - Temporary Facilities and Controls: Temporary interior partitions.
- F. Section 01.7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- G. Section 01.7900 - Demonstration and Training: Demonstration of products and systems to be commissioned and where indicated in specific specification sections
- H. Section 07.8400 - Firestopping.

1.3 SUBMITTALS

- A. See Section 01.3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.4 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of

an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.5 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- G. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.6 COORDINATION

- A. See Section 01.1000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. On finished areas, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01.6000 - Product Requirements.

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Scoreboard foundation.

- H. Periodically verify layouts by same means.

3.5 GENERAL INSTALLATION REQUIREMENTS

- A. 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.
- B. Make vertical elements plumb and horizontal elements level.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.6 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to specified condition.
- D. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- E. Restore work with new products in accordance with requirements of Contract Documents.
- F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07.8400, to full thickness of the penetrated element.
- H. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.7 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.8 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.

EXECUTION AND CLOSEOUT REQUIREMENTS

- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.9 DEMONSTRATION AND INSTRUCTION

- A. See Section 01.7900 - Demonstration and Training.

3.10 ADJUSTING

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

3.11 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Use cleaning materials that are nonhazardous.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean debris from area surrounding new scoreboard..
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.12 CLOSEOUT PROCEDURES

- A. Submit the following prior to final inspection:
 - 1. Preliminary Operation and Maintenance data as outlined in Section 01.7800.
 - 2. Submittals that are required by governing or other authorities.
 - a. Provide copies of such documents to Architect and Owner.
 - 3. Copies of the Contractor's list of items to be completed or corrected prior to final payment.
- B. Notify Architect in writing when work is considered ready for Substantial Completion.
 - 1. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
 - 2. Give notice 10 days prior to requested date for Architect's inspection.
 - 3. Owner will occupy all of the building as specified in Section 01.1000.
 - 4. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- C. The Architect will make an inspection to determine whether the Work or designated portion is substantially complete. The Architect will issue a Punch-list containing any work to be completed prior to Final Inspection and Substantial Completion.
- D. Correct items of work listed and request final inspection when complete.

- E. The Owner and Architect will make a final inspection to determine whether the Work or designated portion is complete. A Certificate of Substantial Completion will be issued with any final items for correction or completion.
- F. Should additional inspection by the Architect, the Architect's consultants or Owner be required due to the failure of the Contractor to complete items previously listed to be incomplete, the Owner may deduct the expense of such inspections from the Contract Sum at the rate shown for such services in the Owner Architect agreement.
- G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- H. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- I. Submit the following after final inspection but prior to the Final Application for Payment:
 - 1. Final Operation and Maintenance data as outlined in Section 01.7800.
 - 2. Final Warranty and Bond information as outlined in Section 01.7800.
 - 3. Surplus materials, final door locking hardware and other items as directed in the Contract Documents.
- J. Perform Demonstration and Training as outlined in Section 01.7900 prior to the Final Application for Payment.
- K. Submit the Final Application for Payment as outlined in Section 01.2000 with all required supporting documentation and Project Record Documents as outlined in Section 01.7800.

3.13 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01.7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.2 RELATED REQUIREMENTS

- A. Section 00.7200 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01.3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01.7000 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.3 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Supporting Documents for Final Payment:
 - 1. Contractor's Affidavit of Payment of Debts and Claims: AIA Document G706, current condition, completed in full.
 - 2. Release of Liens: AIA Document G706A, current condition, completed in full.
 - 3. Consent of Surety Company to Final Payment G707: current edition, completed in full by the bonding company.
 - 4. Power of Attorney: use appropriate documentation.
 - 5. Submit all to Architect with claim for final Application for Payment.
- C. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- D. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit warranty documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
 - 4. Contractor's Guarantee of Work: Provide a sworn statement that all Work is asbestos free and guaranteed against defects in materials and workmanship for one year from date of Owner's acceptance, except where specified for longer periods.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract drawings.

3.2 OPERATION AND MAINTENANCE DATA

- A. 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.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. 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.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.3 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 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. Additional information as specified in individual product specification sections.
- D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.4 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.

2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. 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.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Include test and balancing reports.
- J. Additional Requirements: As specified in individual product specification sections.

3.5 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Binders: Commercial quality, 216 by 280 mm (8-1/2 by 11 inch) three D side ring binders with durable plastic covers; 50 mm (2 inch) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- H. Text: Manufacturer's printed data, or typewritten data on 20 pound paper.
- I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- J. Arrangement of Contents: Organize each volume in parts as follows:
 1. Project Directory.
 2. Table of Contents, of all volumes, and of this volume.
 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Operation and maintenance data.
 - c. Field quality control data.
 - d. Photocopies of warranties and bonds.

3.6 WARRANTIES AND BONDS

- A. All Warranties and Bonds shall be obtained in the Owner's name.
- B. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- C. Verify that documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Retain warranties and bonds until time specified for submittal.
- F. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.
- G. Within the guarantee period the Contractor shall promptly place in satisfactory condition in every particular, all such guaranteed work.
- H. If, after notice, the Contractor fails to proceed promptly to comply with the terms of the guaranty, the Owner may have the defects corrected and the Contractor and his sureties shall be liable for all expenses incurred.

END OF SECTION

SECTION 01.7900

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. Items specified in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Items specified in individual product Sections.

1.2 RELATED REQUIREMENTS

- A. Section 01.7800 - Closeout Submittals: Operation and maintenance manuals.
- B. Other Specification Sections: Additional requirements for demonstration and training.

1.3 SUBMITTALS

- A. See Section 01.3000 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit to Architect for transmittal to Owner.
 - 2. Submit not less than two weeks prior to start of training.
 - 3. Revise and resubmit until acceptable.
 - 4. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D. Training Reports:
 - 1. Identification of each training session, date, time, and duration.
 - 2. Sign-in sheet showing names and job titles of attendees.
- E. Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
 - 1. Format: DVD Disc.
 - 2. Label each disc and container with session identification and date.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.2 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- C. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 - 3. Typical uses of the O&M manuals.
- D. Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 - 3. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 - 4. Discuss common troubleshooting problems and solutions.
 - 5. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 - 6. Review recommended tools and spare parts inventory suggestions of manufacturers.
 - 7. Review spare parts and tools required to be furnished by Contractor.
 - 8. Review spare parts suppliers and sources and procurement procedures.
- E. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 03.1000

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.2 RELATED REQUIREMENTS

- A. Section 03.2000 – Concrete Reinforcement.
- B. Section 03.3000 – Cast-In-Place Concrete.

1.3 REFERENCE STANDARDS

- A. ACI 117.1R – Guide for Tolerance Compatibility in Concrete Construction; American Concrete Institute; 2014.
- B. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute; 2016.
- C. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute; 2014.
- D. ACI 347R – Guide to Formwork for Concrete; American Concrete Institute; 2014.
- E. PS 1 – Structural Plywood; 2009.

1.4 SUBMITTALS

- A. Section 01.3000 – Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Design elevated formwork under direct supervision of a professional engineer experienced in design of concrete formwork and licensed in the state in which the project is located.

PART 2 PRODUCTS

2.1 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
- D. Comply with relevant portions of ACI 347, ACI 301, and ACI 318.
- E. All concrete exposed to view shall be plywood formed.

2.2 WOOD FORM MATERIALS

- A. Softwood Plywood: PS 1, C Grade, Group 2.

2.3 FORMWORK ACCESSORIES

- A. Form Release Agent: Colorless mineral oil that will not stain concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Align joints and make watertight. Keep form joints to a minimum.
- D. Obtain approval before framing openings in structural members that are not indicated on drawings.
- E. Coordinate this section with other sections of work that require attachment of components to formwork.

3.3 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.4 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.5 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.

3.6 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117.

CONCRETE FORMS AND ACCESSORIES

3.7 FIELD QUALITY CONTROL

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
- B. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.8 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03.2000

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing Steel for Cast-In-Place Concrete.
- B. Supports and Accessories for Steel Reinforcement.

1.2 RELATED REQUIREMENTS

- A. Section 03.1000 – Concrete Forms and Accessories.
- B. Section 03.3000 – Cast-In-Place Concrete.

1.3 REFERENCE STANDARDS

- A. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute; 2016.
- B. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute; 2014.
- C. ACI SP-66 – ACI Detailing Manual; American Concrete Institute; 2004.
- D. ASTM A 615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2016.
- E. CRSI – Manual of Standard Practice; Concrete Reinforcing Steel Institute; 2009.

1.4 SUBMITTALS

- A. Section 01.3000 – Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.5 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615 Grade 60.
- B. Reinforcement accessories:
 - 1. Tie wire: annealed, minimum 16 gage.
 - 2. Chairs, bolsters, bar supports, spacers: sized and shaped for adequate support of reinforcement during concrete placement.

2.2 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI – Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Conform to applicable code for concrete cover over reinforcement.

END OF SECTION

SECTION 03.3000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Foundations, Slabs on Grade and Floors.
- B. Cast-In-Place Concrete Site Structures.
- C. Joint Devices Associated With Concrete Work.
- D. Concrete Curing.

1.2 RELATED REQUIREMENTS

- A. Section 03.1000 – Concrete Forms and Accessories.
- B. Section 03.2000 – Concrete Reinforcement.

1.3 REFERENCE STANDARDS

- A. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute; 1991 (Reapproved 2002).
- B. ACI 301 – Specifications for Structural Concrete for Buildings; American Concrete Institute; 2016.
- C. ACI 302.1R – Guide for Concrete Floor and Slab Construction; American Concrete Institute; 2015.
- D. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute; 2000(Reapproved 2009).
- E. ACI 305R – Guide to Hot Weather Concreting; American Concrete Institute; 2010.
- F. ACI 306R – Guide to Cold Weather Concreting; American Concrete Institute; 2016.
- G. ACI 308R – Guide to External Curing of Concrete; 2016.
- H. ACI 318 – Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute; 2014.
- I. ASTM C 33 – Standard Specification for Concrete Aggregates; 2016.
- J. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2017.
- K. ASTM C 94 – Standard Specification for Ready-Mixed Concrete; 2014.
- L. ASTM C 143 –Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015.
- M. ASTM C 150 – Standard Specification for Portland Cement; 2015.
- N. ASTM C 171 – Standard Specification for Sheet Materials for Curing Concrete; 2016.
- O. ASTM C 260 – Standard Specification for Air-Entraining Admixtures for Concrete; 2010.
- P. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- Q. ASTM C 494 – Standard Specification for Chemical Admixtures for Concrete; 2017.
- R. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2017.
- S. ASTM C 1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.
- T. ASTM D 994 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 2011 (Reapproved 2016).

- U. ASTM D 1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).
- V. ASTM E 1155 – Standard Test Method For Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 2014.
- W. COE CRD–C 513 – COE Specifications for Rubber Waterstops; Corps of Engineers; 1974.

1.4 SUBMITTALS

- A. Section 01.3000 – Administrative Requirements, for submittal procedures.
- B. Samples: Submit two, 6 inch long samples of waterstops and construction joint devices.
- C. Samples: Submit samples of underslab vapor retarder to be used.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.1 FORMWORK

- A. Comply with requirements of Section 03.1000.

2.2 REINFORCEMENT

- A. Comply with requirements of Section 03.2000.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C 150, Type I or II – Normal Portland type.
 - 1. Acquire All Cement For Entire Project From Same Source.
- B. Fine and coarse aggregates: ASTM C 33.
 - 1. Acquire all aggregates for entire project from same source.
- C. Fly Ash: ASTM C 618, CLASS C or F.
- D. Water: Clean and not detrimental to concrete.

2.4 CHEMICAL ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C 260.
- C. Water Reducing And Accelerating Admixture: ASTM C 494 Type E.

2.5 ACCESSORY MATERIALS

- A. Non-Shrink Grout: ASTM C 1107; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum compressive strength at 28 days: 7,000 PSI.
- B. Moisture-Retaining Cover: ASTM C 171; regular curing paper, white curing paper, clear polyethylene, white polyethylene, or white burlap-polyethylene sheet.
- C. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent. The use of curing compounds is not allowed on the interior of the building. Acceptable for sidewalks and concrete paving.

CAST-IN-PLACE CONCRETE

- D. Underslab Vapor Barrier: Comply with requirements of Section 03.0505 – Underslab Vapor Barrier

2.6 BONDING AND JOINTING PRODUCTS

- A. Waterstops: Rubber, complying with COE CRD-C 513. Use maximum possible lengths, preformed corner sections and heat welded jointing.
- B. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, width/depth as indicated.

2.7 CONCRETE MIX DESIGN

- A. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- B. Normal Weight Concrete:
 - 1. Compressive strength, when tested in accordance with ASTM C 39 at 28 days: as indicated on drawings.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Water-Cement Ratio: Maximum 45 percent by weight.
 - 4. Maximum Slump: 4 inches.
 - 5. Air Entrainment (exterior concrete): 4% - 8%.

2.8 MIXING

- A. Transit Mixers: Comply with ASTM C 94.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify architect not less than 48 hours prior to commencement of placement operations.
- D. Install joint devices in accordance with manufacturer's instructions.
- E. Place concrete continuously between predetermined expansion, control, and construction joints.
- F. Do not interrupt successive placement; do not permit cold joints to occur.

3.4 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed form finish: rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed form finish: rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth rubbed finish: wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R.

- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.5 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than 7 days.
 - 2. High early strength concrete: Not less than 4 days.
- C. Surfaces not in contact with forms:
 - 1. Initial curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 - a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
 - b. Spraying: Spray water over floor slab areas and maintain wet.
 - c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
 - 2. Final curing: Begin after initial curing but before surface is dry.
 - a. Moisture-Retaining Cover: Seal in place with waterproof tape or adhesive.
- D. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.6 FIELD QUALITY CONTROL

- A. Submit proposed mix designs for review prior to commencement of concrete operations.
- B. Compressive Strength Tests: ASTM C 39. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 50 cu yd or less of each class of concrete placed.
- C. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- D. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C 143.

3.7 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the architect. The cost of additional testing shall be borne by contractor when defective concrete is identified.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of architect for each individual area.

END OF SECTION

SECTION 05.1200 STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members, support members.

1.2 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.; 2005.
- B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.; 2005.
- C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 bolts; 2004.
- D. ASTM A 36 - Standard Specification for Carbon Structural Steel; 2005
- E. ASTM A 53 - Standard Specification for Pipe, Steel, Black and Hot-dipped, Zinc-coated, Welded and Seamless; 2007.
- F. ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
- G. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.
- H. ASTM A 992 - Standard Specification for Structural Steel Shapes; 2006a.
- I. ASTM E 94 - Standard Guide for Radiographic Examination; 2004.
- J. ASTM E 164 - Standard Practice for Ultrasonic Contact Examination of Weldments; 2008.
- K. ASTM E 165 - Standard Test Method for Liquid Penetrant Examination; 2002.
- L. ASTM E 709 - Standard Guide for Magnetic Particle Testing; 2008.
- M. ASTM F 1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2007a.
- N. AWS D1.1 - Structural Welding Code - Steel; American Welding Society; 2008.

1.3 SUBMITTALS

- A. See Section 01.3000 – Administrative Requirements.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
 - 2. Connections not detailed.
 - 3. Indicate cambers and loads.
- C. Manufacturer's Mill Certificate: certify that products meet or exceed specified requirements.
- D. Welders Certificates: certify welders employed on the work, verifying AWS qualification within the previous 12 months.

1.4 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual".
- B. Fabricator: A qualified fabricator who participates in the AISC certification program and is designated an AISC plant. Company specializing in performing the work of this section with minimum 5 years of documented experience.
- C. Erector: A qualified installer who participates in the AISC certification program and is designated an AISC certified erector. Company specializing in performing the work of this section with minimum 5 years of

documented experience.

- D. Design connections not detailed on the drawings under direct supervision of a professional structural engineer experienced in design of this work and licensed in the state in which the project is located.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel angles and plates: ASTM A 36.
- B. Steel w shapes and tees: ASTM A 992.
- C. Rolled steel structural shapes: ASTM A 992.
- D. Cold-formed structural tubing: ASTM A 500, grade B.
- E. Pipe: ASTM A 53, grade B, finish black.

2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

2.3 FINISH

- A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

PART 3 - EXECUTION

3.1 ERECTION

- A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
- B. Do not field cut or alter structural members without approval of architect.
- C. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.2 FIELD QUALITY CONTROL

- A. Welded connections: visually inspect all field-welded connections and test as noted in the quality assurance plan in the structural drawings using one of the following:
 - 1. Radiographic testing performed in accordance with ASTM E 94.
 - 2. Ultrasonic testing performed in accordance with ASTM E 164.
 - 3. Liquid penetrant inspection performed in accordance with ASTM E 165.
 - 4. Magnetic particle inspection performed in accordance with ASTM E 709.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to the work of this section.

1.2 SCOPE

- A. The work required under this section consists of all paintings and related items necessary to complete the work as indicated in the Contract Documents.

1.3 SUBMITTALS

- A. Submit manufacturer's full and complete color charts for all materials specified to Architect for color selection. Architect will furnish a complete color scheule (via Bulletin) indicating all colors for materials to be painted.
- B. Submit information from paint manufacturer. Contractor shall cross-reference submitted information with specified requirements to illustrate compliance with this specification. Information shall include recommendations equal to grade, quality and type paint listed in the Schedule of painting specified herein.

1.4 DELIVERY AND STORAGE OF MATERIALS

- A. All materials shall be delivered to the job site and stored in original, unbroken containers bearing the manufacturer's name and type of paint. Empty containers shall be punctured and kept on the job until completion of painting. All paint materials shall be kept in a locked room assigned to the painting subcontractor for this purpose. Use of other parts of the building for storage and/or mixing of paint materials is prohibited. Follow all applicable regulations and precautions to prevent fire.

1.5 QUALITY ASSURANCE

- A. Use adquate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements adn methods needed for proper performance fo the work of this section.
- B. Paint Coordination:
 - 1. Provide finish coats which are compatible with the prime coat.
 - 2. Review other sections of these specifications assuring compatibility to the total coating system.
 - 3. Provide barrier coat over noncompatible primers or remove primer and re-prime as required.
 - 4. Notify the Architect in writing of anticipated problems using specified coating system over primer coatings supplied under other sections.

1.6 ENVIRONMENTAL CONDITIONS

- A. Do not apply paint when temperatures of surfaces to be painted and the surrounding air temperatures are below 50 degrees F. for exterior and 60 degrees for interior unless otherwise permitted by the manufacturer's printed instructions and Approved by the Architect.

1.7 INSPECTION OF SURFACES

- A. The painting subcontractor shall be responsible for the quality of his work and shall not commence any part of it until surfaces to be painted are in proper condition. If work, metal, masonry, or any other surface to be finished cannot be put in proper condition for finishing by specified cleaning, sanding or puttying operation, then the painting subcontractor shall immediatly notify the General Contractor and Architect in writing or assume full responsibility for rectifying any unsatisfactory finish results.

1.8 EXTENT OF PAINTING

- A. Prime coats specified herein will not be required on items delivered with prime or shop coats already applied. Touch-up shop primer coat as may be required before applying finish coats of paint.
- B. All exposed structural and miscellaneous steel unless noted otherwise.
- C. All other items as indicated on the drawings and herein specified.

PART 2 - PRODUCTS

2.1 APPROVAL OF MATERIALS

- A. Materials included in the Schedule of Painting shall be products of the following manufacturers:
 - 1. Benjamin Moore Paint Co.
 - 2. Sherwin Williams
 - 3. Porter Paints
 - 4. Hillyard Chemical Corp.
 - 5. Equal products by Glidden and Devoe may be acceptable when explicitly approved by the Architect.
- B. Materials such as linseed oil, shellac, turpentine, mineral spirits and putty shall be of highest quality and shall have identifying labels on containers.
- C. Painting materials shall be available for inspection at all times to determine if specified and approved materials are being used.

PART 3 - EXECUTION

3.1 PREPARATION OF SURFACES

- A. All surfaces shall be clean and dry at the time any coating is applied. Base coats provided shall be in good condition and the surface well-covered by touching up any bare or abraded spots.
- B. Clean metal surfaces thoroughly with turpentine, benzine or other suitable solvents to remove dirt, oil and grease. Remove all rust or scale by scraping or wire-brushing. Touch up with specified paint.
- C. Prior to painting and varnishing, remove all hardware, accessories, plates, fixtures and similar items. Upon completion of painting and drying of finish, replace all items.
- D. MIXING
 - 1. Use a mechanical mixer for all required mixing. No material shall be reduced or changed in any way except as specified. Use only fresh materials.
- E. TINTING
 - 1. All tinting and/or color matching shall be carefully performed under the supervision of the General Contractor and Architect. Contractor shall provide mock-ups for all tinting and/or color matching items for Architect's review. Once approved, the mock-ups will become the standard of quality and shall be utilized for acceptance and rejection of the work.
- F. THINNING
 - 1. Thin materials, if necessary, only in accordance with manufacturer's instructions to obtain proper spraying or brushing viscosity. Excessive thinning which would cause sprayed paint to run shall not be allowed.
- G. APPLICATION
 - 1. Apply all painting in accordance with published directions of the paint manufacturer.
 - 2. Coats: The number of coats specified for various finishes represents the minimum number of coats required to obtain satisfactory cover. The Architect shall review all surfaces upon completion of painting. If satisfactory cover has not been obtained in the opinion of the Architect, additional coats shall be applied (at no additional cost) to achieve acceptable coverage.
 - 3. Do not apply exterior paint immediately after a rain or during foggy or rainy weather conditions or when temperature is below 50 degrees F. Do not apply interior finish paint when temperature is below 60 degrees F.
 - 4. Surfaces to be varnished shall be clean, dry, smooth and adequately protected from dampness.
 - 5. Finish work shall be uniform, smooth and free of runs, sags, defective brushing and clotting and of approved color. Make edges of painted surfaces adjoining other materials of colors sharp, true to line and clean without overlapping.

PAINTING

H. EXTRA PAINT

1. The subcontractor shall leave no less than one (1) gallon of paint of each color and type at the end of the project. Include a itemized receipt signed by the Owner's representative of all excess paint provided.

I. CLEANING

1. Upon completion of the work, the painting subcontractor shall remove all surplus materials, scaffolds, debris, etc., from the site and clean all painted surfaces of mis-placed paint and varnish. Touch-up and restore finish where damaged and leave in good condition.

J. SCHEDULE OF PAINTING

1. The types and numbers of coats required on various surfaces shall be (at a minimum) equal to the following:
2. Exterior Ferrous Metal:
 - a. First Coat: Touch-up shop coat with M06 Alkyd Metal Primer
 - b. Second Coat: Moorcraft Super Spec Urethane Alkyd Gloss Enamel Z22
 - c. Third Coat: Moorcraft Super Spec Urethane Alkyd Gloss Enamel Z22
 - d. Fourth Coat: Moorcraft Super Spec Urethane Alkyd Gloss Enamel Z22
3. Exterior Ferrous Metal, Galvanized:
 - a. Touch-up Coat: Fully surface coating two component epoxy. Benjamin Moore Industrial Coatings CM18/CM19 Epoxy Zinc Rich Primer.

END OF SECTION

ELECTRICAL GENERAL AND WORK IN EXISTING FACILITIES

PART 1 – GENERAL

1.1 GENERAL

- A. All work shall conform to the latest editions of the National Electrical Code (NEC) [National Fire Protection Association (NFPA) 70], the Standard for Electrical Safety in the Workplace (NFPA 70E), the Life-Safety Code (NFPA 101), the International Building Code, the Americans with Disabilities Act, and all other applicable federal, state, and local codes and regulations.
- B. All work shall be performed in strict compliance with NFPA 70E. Submission of bid shall stand as an agreement by the Contractor to indemnify and hold harmless the Engineer and Owner from all liability related to damage and/or injury to personnel and equipment during the installation of the project.
- C. The contract documents are schematic in nature and are intended to convey the intent of the electrical work to be performed on this project. Provide all material, labor, equipment, etc., necessary to provide complete and operable electrical systems.
- D. The General Conditions, Supplementary Conditions, General Requirements, Information to Bidders, and all other parts of this set of Contract Documents are hereby adopted and are applicable to the Division 26, 27, and 28 Contractor.

1.2 SCOPE OF WORK

- A. Visit site prior to bid. Devise a plan for installation of complete and operable electrical systems meeting the requirements and intent of the Contract Documents. Submission of Bid stands as evidence that the Contractor accepts the Contract Documents as sufficient and complete for the work to be performed. Notify the engineer at least two weeks prior to bid of any discrepancies between the Contract Documents and actual field conditions. No change orders will be granted due to existing conditions that could have been observed during a site visit.
- B. Provide temporary power and lighting during construction. Coordinate with the General Contractor for the exact requirements.
- C. Electrical switchgear and panelboard layouts are based on sizes of Square D equipment. Equipment manufactured by General Electric, Siemens, and Cutler Hammer are equally acceptable. However, the Electrical Contractor is responsible for selecting and furnishing gear that will fit in the spaces provided and shall be responsible for arranging the gear to meet the required code clearances. Regardless of the manufacturer, the Electrical Contractor shall provide a drawn-to-scale electrical layout with the equipment brochures for all rooms in which panelboards, motor control centers, switchboards, or switchgear are placed. The drawings shall include the work of all other trades including mechanical system piping, ductwork, sprinkler piping, etc. No conduits shall be installed until layouts have been approved.
- D. Locate junction boxes, pull boxes, disconnects, and other equipment requiring access in such a manner that they are accessible at the end of construction. Notify the Architect where it is impossible to plan conduit routing or equipment placement in such a manner, and provide the necessary access panels in the ceiling or wall as required. The access panel type and style shall be subject to the Architect's approval. Employ a painter to provide the appropriate coatings as directed by the Architect.

- E. Relocate, or recircuit, all electrical equipment, conduit, and circuitry conflicting with or obstructing work on this project. Where the electrical systems are owned by other entities, pay them to relocate, or recircuit, their facilities.
- F. Arrange for connection of service to all electrical systems by the appropriate utility company. Coordinate completely with all utility company requirements even if they are different than the contract documents. If utility company requirements are different from the contract documents, notify the engineer at least ten days prior to bid. Pay all utility company charges necessary for installation and connection of service. **No change orders will be granted for utility company connection fees.**
- G. Provide all necessary equipment, raceway, circuitry, fittings, lugs, terminations, labor, etc. and connect to all equipment and appliances requiring electrical connections furnished herein, by the Owner, or by other Contractors. Prior to ordering electrical equipment and roughing in for equipment furnished by the Owner or other Contractors, verify all connection types, connection locations, connection heights, voltages, number of phases, conductor sizes, disconnecting means, breaker sizes, etc. Furnish the proper electrical equipment for the equipment actually being supplied.

1.3 WORK IN EXISTING FACILITIES

- A. All work shall be scheduled and coordinated through the General Contractor with the Owner. Provide necessary costs for all work during both normal and premium work hours in bid.
- B. Provide continuous uninterrupted power to all existing facilities to remain during the entire construction process. Any required power outages must be scheduled and approved by the Owner in writing at least three days prior to the outage.

1.4 SCOPE OF WORK IN EXISTING FACILITIES

- A. Prior to beginning work, survey existing electrical systems. Document, in writing, signed by the Owner any portions of existing systems that are not operating properly before construction begins. Any electrical systems found inoperable at the end of the construction process that has not been so documented shall be repaired at the end of construction.
- B. Remove electrical equipment in areas being demolished and electrical equipment feeding other equipment being demolished. Remove raceways and circuitry back to the panel of origination. Where raceways are installed in inaccessible areas, remove conductors back to the panel of origination. Where circuits are not being completely demolished, remove conductors back to a junction box or other connection point outside of the renovated area and recircuit existing electrical equipment that is to remain as required. Where necessary, completely refeed existing electrical equipment that is to remain. It is the intent of this specification that all existing equipment to remain be left completely operable at the end of the construction process.
- C. Survey existing panel board circuitry and provide new typewritten directories giving complete as-built circuitry information for all panelboards affected by the construction on this project.
- D. Where new circuit breakers are installed in existing equipment, the new circuit breakers shall be manufactured for installation in that equipment. The Amperes Interrupting Current (AIC) Rating shall equal the AIC rating of the existing equipment. A breaker with a lower AIC rating may be used if the contractor provides calculations showing that the breaker rating is sufficient to handle the available fault current. Submit these calculations for approval prior to ordering the breaker. An AIC rating on an existing breaker in the panelboard or switchboard does not demonstrate sufficient proof that the available fault current is less than that breaker's AIC rating.

1.5 SUBMITTALS AND SHOP DRAWINGS

ELECTRICAL GENERAL AND WORK IN EXISTING FACILITIES

- A. Within 30 days after award of Contract and prior to beginning work, provide six bound copies of manufacturers' cut sheets containing information concerning each article of electrical equipment to be furnished on this project. These cut sheets shall contain sufficient information to prove compliance with the contract documents. Information addressing the requirements of the contract documents shall be highlighted. Each bound set shall bear the stamp of the Electrical Contractor as well as the General Contractor.
- B. Within 30 days after award of Contract and prior to beginning work, provide six sets of full size shop drawings showing exact equipment locations with all equipment drawn to scale. Show all raceways with their junction boxes and pull boxes. Show all connection types, locations, and heights to equipment. Provide mounting and support details for all raceways and equipment. Coordinate with all other trades to ensure that there are no conflicts between systems. Each set of shop drawings shall bear the stamp of the Electrical Contractor, the General Contractor, and all Project Sub-Contractors. Failure to submit these Shop Drawings will render the Electrical Contractor responsible for resolving all conflicts between trades at his own expense.
- C. Submittals and Shop Drawings are reviewed to determine quality of materials. Approval of submittals and shop drawings does not relieve the Contractor of meeting the requirements and intent of the Contract Documents.
- D. Outlet, light fixture, and device locations are shown in their approximate locations on the drawings. Coordinate with Architectural drawings to get final locations. Mount all electrical outlets shown at counters such that the bottom of the box is two inches above the backsplash or six inches above a counter with no backsplash. The Owner reserves the right to relocate outlets, light fixtures, and devices a distance not to exceed twenty feet prior to the installation of outlet boxes.

PART 2 - PRODUCTS

- 2.1 All electrical equipment and materials shall be new. All equipment and materials shall be stored on the job site in weatherproof enclosures. Electronic equipment shall be stored in facilities where the temperature and humidity are controlled. In addition, comply completely with all manufacturers' requirements for storage and handling.
- 2.2 All equipment shall be UL listed for the application in which it is used and shall be labeled as evidence of its UL listing.
- 2.3 Each circuit breaker supplying a multiwire branch circuit shall be installed with a manufacturer supplied handle tie to simultaneously disconnect all ungrounded conductors. Each multi-wire branch circuit shall comply with NEC article 210.4.
- 2.4 Products shall be selected to maintain or improve the aesthetics of the facility. Gain approval of the Architect or Engineer prior to ordering or installing any electrical equipment or raceway.

PART 3 – EXECUTION

3.1 WORKMANSHIP

All work shall be performed with an emphasis on neatness. The Engineer, Architect, and Owner retain the right to reject work that is, in their judgment, unsatisfactory.

3.2 EXPERIENCE

The Contractor shall have completed at least two jobs of similar size and scope within the past five years. The Engineer reserves the right to reject Contractors based on their inability to submit evidence of their experience, or based on experience with the Contractor on previous projects.

3.3 PERMITS

Obtain and pay for all permits required for work.

3.4 FIREPROOFING

- A. Fireproof all penetrations through firewalls with a fireproofing compound listed to maintain the rating of the wall through which the raceway passes.
- B. The fire-stopping caulk shall be a one-part, intumescent, latex elastomer. The caulk shall be capable of expanding a minimum of 3 times at 1000°F. The material shall be thixotropic and be applicable to overhead, vertical and horizontal fire-stops. The caulk shall be listed by independent test agencies such as UL or FM and be tested to, and pass the criteria of, ASTM E 814 Fire Test, tested under positive pressure. It shall comply with the requirements of the NEC (NFPA-70), BOCA, ICBO, SBCCI and NFPA Code 101. Fire-stopping caulk shall be paintable, but shall be non-hardening. Fire-stopping caulk shall be 3M Fire barrier CP or approved equal.
- C. The fireproofing materials shall be installed by individuals certified to perform such work. Submit evidence of personnel certifications with electrical equipment brochures.
- D. Where cable trays are shown crossing firewalls, terminate the cable tray on each side of the wall and run the conductors through conduits installed in the wall. Fireproof around the conductors after installation.
- E. Provide mineral wool packing and all other materials recommended by the manufacturer for a complete installation.

3.5 FLASHING

Provide all necessary equipment and flash all roof penetrations in such a manner to ensure that all penetrations are completely sealed and all roof warranties remain in effect. Where there are no roof warranties, the Electrical Contractor shall guarantee the electrical penetrations against leaking for a period of one year from project completion. Employ a professional roofing contractor to perform all flashing.

3.6 PROTECTION

- A. Keep energized equipment covered during all phases of construction. Use enclosures, doors, covers, etc., to ensure that neither personnel nor machinery contact live electrical equipment.
- B. Replace electrical equipment that is damaged during construction.

3.7 DAMAGED FACILITIES

- A. Locate all existing site equipment and utilities prior to beginning construction. Repair all equipment and utilities damaged during construction, or pay for the repair of the equipment and utilities where required by the Owner of the damaged facilities.
- B. Coordinate the routing of all circuits and the locations of all devices with the Architect or Engineer and the Owner. Shop drawings shall describe completely the locations and elevations of all raceways, boxes, fittings, and equipment.

ELECTRICAL GENERAL AND WORK IN EXISTING FACILITIES

3.8 EXCAVATION AND BACKFILL

- A. Excavate in such a manner as to minimize erosion of the soil. Backfill trenches around conduits with fine sand that is free of rocks, clods, and debris. Fill sand a minimum of 4" over conduits. Backfill the rest of the trench in six inch increments, wetted, and tamped. Final compaction shall be a minimum of 95% of that of the adjacent earth. Resurface the grade with the same material as that excavated from the grade whether it be paving, concrete, sod, etc. Repair work shall be comparable to the quality of the original site prior to excavation.
- B. Provide a 3" wide plastic labeled marker tape 12" below grade over all electrical conduits buried underground. Tapes for power circuits shall have a warning such as "Caution: Buried Electrical Line Below." Labels on tapes for telephone, data, cable television, and other facilities shall adequately describe the line over which they are buried.
- C. Provide a #12 AWG wire in each buried conduit run labeled accordingly on each end.

3.9 IDENTIFICATION

- A. Label all switchboards, panel boards, motor starters, disconnects, and motor control centers furnished under Division 26, 27, and 28 and other divisions of this contract with engraved rigid plastic nameplates having letters at least ¼ inch high. Nameplates shall be bolted to the enclosure. All labels shall indicate the voltage, number of phases, the AIC rating, and the panelboard and circuit number from which the device is fed.
- B. All circuit breakers in Switchboards, Motor Control Centers, Square D I-Line, and similar panel boards shall be labeled with plastic nameplates (as described in Part A) providing the name of the load served and the ampacity and number of poles of the breaker.
- C. All Square D NQOD, NF and similar panel boards shall have typewritten circuit directories.
- D. Label all conductors at all junction boxes, pull boxes, and terminations with typewritten adhesive markers indicating the panel board or switchboard name and circuit number of the conductor. Labels shall be Brady Datab or approved equal.
- E. Label all junction boxes and pull boxes with stenciled painted letters containing the name of the panel board and circuit numbers of the circuits contained within. Use black paint for normal circuits, red paint for emergency circuits, and orange paint for fire alarm circuits. The Contractor may select other colors for junction boxes and pull boxes for auxiliary systems.
- F. Label all conduits in the most likely direction of access and view every 50' and on both ends of each bend with stenciled painted letters containing the name of the panel board and circuit numbers of the circuits contained within. Use black paint for normal circuits, red paint for emergency circuits, and orange paint for fire alarm circuits. The Contractor may select other colors for conduits for auxiliary systems.

3.10 AS-BUILT DRAWINGS

Maintain one set of drawings during construction for as-built markings. Mark these drawings in red to indicate field changes. Provide these drawings to the Engineer at the end of the construction process. Where required under the General Conditions, Special Conditions, or other portions of this contract, provide revised computer drawn as-built drawings to the Engineer at the end of construction.

3.11 TESTING

- A. Test all systems, or pay testing agencies as required, for compliance with the requirements of all regulatory agencies.
- B. Test the electrical power service ground using a Biddle Three-Terminal Ground Resistance Tester, or approved equal. Grounds shall meet the requirements of the NEC, or of Specification 26 05 26, whichever is more stringent. Test grounds only when the earth is dry. Provide additional ground rods as necessary to achieve the required results.
- C. Prior to making final equipment connections, test all service, feeder, and branch circuit conductors for continuity, phase-to-phase faults, and phase-to-ground faults using a Megger BM100 or approved equal test instrument generating 500 Vdc. Insulation resistance shall be a minimum of 500,000 Ohms between any conductor and ground and 1,000,000 Ohms between any two conductors.
- D. Test other systems as required in their respective specifications.
- E. Provide three bound copies of all test results to the Engineer at the end of the construction process. No Recommendation of Substantial Completion will be granted until all testing reports have been submitted.

3.12 WARRANTY

Provide the Owner a written guarantee to repair, or replace, all faulty equipment and systems for a period of one year from date of Substantial Completion. During this one-year period, a representative of the Contractor shall be on the site actively working on the repairs within 24 hours of the Owner's telephone call. During this period of time, the Owner shall not be charged for any repair work or expenses related with the repair work unless the Contractor can prove that the Owner has damaged the equipment or system.

END OF SECTION

SECTION 26.0519

600V CONDUCTORS

PART 1 – GENERAL

Provide all circuitry, terminations, splices, connectors, lugs, and other equipment necessary for connection of all equipment requiring electrical connections.

PART 2 – PRODUCTS

- 2.1 All electrical conductors shall be soft-drawn annealed copper having 98% conductivity and an insulation rating of 600V.
- 2.2 Conductors shall be UL listed for installation in the raceway in which they are to be installed.
- 2.3 Conductors shall be rated 90 degrees C for use in residential, commercial, industrial, and institutional facilities, and shall be listed as 105 degrees C appliance wire. Conductors shall be listed under UL 83, UL 1063, and UL 758. If XLP or EPR insulation is used, conductors shall be listed under UL 44 and NEMA WC7.
- 2.4 Conductors used for branch circuits, feeders, auxiliary systems, and controls run in dry locations shall have PVC insulation and a Nylon outer jacket. They shall be THHN/THWN or XHHW-2.
- 2.5 Conductors used for branch circuits, feeders, auxiliary systems, and controls run in wet locations shall have XLP or EPR insulation and be type XHHW-2.
- 2.6 Conductors used for operating room isolation panels and associated branch circuits shall be copper stranded conductor having a cross-linked polyethylene insulation or equivalent with a dielectric constant of 3.5 or less. Wire-pulling compounds that increase the dielectric constant shall not be used on the secondary conductors of isolation panels. The isolated circuit conductors shall be identified as follows:

Isolated Circuit #1 – Orange

Isolated Circuit #2 – Brown

For 125 volt, 15 & 20 ampere receptacles: The orange conductor shall be connected to the terminal on the receptacle that is identified in accordance with NEC 200.10(B) for connection to the grounded circuit conductor.

- 2.7 Conductors used for services shall be type SE for aerial services or type USE-2 for underground services.
- 2.8 Sizes #10 and #12 shall be solid conductors except where used for controls. All controls conductors shall be stranded.
- 2.9 Use minimum #14 AWG conductors for controls and auxiliary circuits. Use larger conductors as required to compensate for voltage drops exceeding 3% of the system voltage.
- 2.10 Conductors shall be furnished in the colors described below unless local ordinances require different colors. Conductors #8 and smaller shall be furnished with colored insulation; conductors larger than #8 shall be taped with the appropriately colored tape for a length of at least 2" at each panelboard, junction box, pull box, load, or other exposed location. Ground conductors shall be taped green for their entire exposed length.

System Voltage	208Y/120V, 3-Phase, 4-Wire	120/240V, 3-Phase, 4-Wire	480Y/277V, 3-Phase, 4-Wire	
Phase A	Black	Black	Brown	
Phase B	Red	Orange	Orange	
Phase C	Blue	Blue	Yellow	
Neutral	White	White	Gray	
Ground	Green	Green	Green	

2.11 Conductor sizing chart:

Voltage Drop Chart for 20amp single pole circuits		
Voltage	Circuit Length	Conductor size (awg)
120	< 90'	#12
120	> 90'	#10
120	> 145'	#8
120	> 230'	#6
277	< 200'	#12
277	> 200'	#10
277	> 325'	#8
277	> 525'	#6

- A. Circuit sizes indicated on the drawings are minimum NEC requirements. Refer to this chart for upsizing conductors based on circuit length.
- B. Do not connect conductors larger than #10 directly to a receptacle or a switch. Provide a junction box to downsize the conductor to #12 at the device.
- C. For circuits longer than those listed above, consult with the Engineer for conductor sizes.

PART 3 – EXECUTION

- 3.1 Install conductors carefully using a minimum of two tradesmen – one feeding the conductors into the conduit, and the other pulling the conductors into the conduit.
- 3.2 **Each branch circuit and multiwire branch circuit shall be run with its own neutral conductor complying with NEC article 200.4.**
- 3.3 Join stranded conductors with appropriate mechanical or compression lugs. Wire nuts may be used for solid conductors only.
- 3.4 Splices shall only be made in approved enclosures. Splices shall not be pulled inside conduits.
- 3.5 Provide cable supports and strain relief connectors as required by the NEC.

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- 3.6 Furnish junction boxes, pull boxes, handholes, manholes, etc. as required to ensure that the maximum number of bends allowed by the NEC are not exceeded and to ensure that the cables are not damaged during installation.

END OF SECTION

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 GENERAL

Ground all equipment, systems, structures, etc., per the latest edition of the National Electrical Code (NEC).

PART 2 – PRODUCTS

- 2.1 Use mechanical bolted connections in dry locations that are accessible.
- 2.2 Use exothermic welds in wet locations and locations that will be inaccessible at the end of construction.
- 2.3 Ground rods shall be UL listed 3/4" x 10' copper-clad steel ground rods with a minimum copper cladding thickness of 10 mils.

PART 3 – EXECUTION

- 3.1 Ground rods shall be installed with their tops no less than 6" below grade.
- 3.2 Bond ground connections to metal raceways at each end of the conduit run. Provide grounding bushings where required by the NEC. Where cable trays are used, bond the ground conductor to each section and fitting of the tray.
- 3.3 Provide all circuits with an equipment grounding conductor sized per the NEC, or as shown on the drawings. Circuitry shown on drawings does not include the required equipment grounding conductor. Where multiple circuits are run with a common neutral, only one equipment grounding conductor is needed. The equipment grounding conductor shall be furnished with green insulation for conductors #8 AWG and smaller; where larger than #8, the equipment grounding conductor shall be taped green for its entire exposed length.
- 3.4 The grounding electrode conductor(s) shall be bare or shall be colored green for its entire exposed length.
- 3.5 Individual ground conductors shall be installed in PVC conduit sized per the NEC.
- 3.6 Provide receptacles, luminaires, and other devices with a green conductor that bonds the receptacle grounding screw or pigtail, the outlet box grounding screw, and the equipment grounding conductor together.
- 3.7 In health care facilities, where two or more different panel boards serve the same patient-care area, an 8 AWG insulated continuous copper conductor shall bond these different panel boards together.
- 3.8 Telephone, cable television, and other auxiliary systems shall be bonded to the electrical building service ground using a conductor no smaller than #6 AWG.

END OF SECTION

RACEWAYS, OUTLET BOXES AND JUNCTION BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 GENERAL

- A. All electrical systems circuitry shall be contained in raceways unless expressly listed in the specification for that system.
- B. Outlet Boxes and Junction Boxes
 - 1. Furnish and install all outlet boxes and junction boxes in accordance with this specification and the requirements of the NEC.
 - 2. Provide outlet boxes for all switches, receptacles, luminaires, telephone jacks, cable jacks, and other devices furnished in this Contract. Provide all necessary hardware including, but not limited to, additional structural support, support brackets, screws, bolts, fixture studs, etc.
 - 3. Outlet boxes and junction boxes in dry locations shall be galvanized stamped steel boxes sized per the latest edition of the National Electrical Code (NEC), but no less than 4" x 4" x 2 1/8" deep. The thickness of the steel shall be in compliance with the requirements of the NEC. Provide stamped steel covers for all junction boxes manufactured to fit the particular box on which it is used.
 - 4. Outlet boxes used in concrete and masonry walls and ceilings shall be of the concrete type manufactured for such applications.
 - 5. Outlet boxes and junction boxes in wet locations shall be of cast metal construction with gasketed waterproof covers. All conduit connections to the boxes shall be made watertight.
 - 6. Wall outlet boxes shall be 4" x 4" x 2 1/8", or larger as required, with plaster rings provided for final flush installation. Plaster rings shall have single-gang openings unless the equipment mounted inside requires two-gang installation.
 - 7. Floor boxes in slabs on grade shall be deep rectangular, cast iron, fully adjustable boxes with brass rings. Covers shall be made of brass and shall provide flip top access to the power or data jacks inside. Screw-on covers are not acceptable unless a flip-top cover is unavailable for the device installed in the floor box. Provide the box sized as required for the number of devices shown installed. Boxes shall be as follows, or approved equal:
 - a. Single-Gang Boxes: Hubbell B2436
 - b. Single-Gang Cover Plates: Hubbell S3825
 - c. Double-Gang Boxes: Hubbell B4233
 - d. Double-Gang Cover Plates: Two Hubbell S3825 Cover Plates
 - e. Triple-Gang Boxes: Hubbell B4333
 - f. Triple-Gang Cover Plates: Three Hubbell S3825 Cover Plates
 - 9. Receptacles installed in floor boxes shall be as described in Specification 260923, Switches and Receptacles. Data, Telephone, or Combination Data and Telephone Outlets shall consist of Category 6 rated RJ45 jacks mounted in a Hubbell DJOI strap for use under a S3825 flip top cover plate.

11. Size all boxes per the requirements of the latest NEC.

1.2 SCOPE OF WORK

A. Raceways

1. Provide all raceways, fittings, couplings, anchors, supports, hangers, etc. for complete raceway systems.
2. Use Schedule 40 polyvinyl chloride (PVC) conduit for circuits run underground and in slabs on grade level. Provide PVC-coated galvanized rigid steel elbows and PVC-coated galvanized rigid steel conduit for all vertical runs extending to a point at least 6" above grade. Galvanized Rigid steel conduit coated with two complete coats of asphaltum or bituminous paint may be used in lieu of PVC-coated galvanized rigid steel conduit.
3. Use Galvanized Rigid Steel (GRS) conduit for all applications where circuits are run above ground exposed to the weather.
4. Use Electrical Metallic Tubing (EMT) for all branch circuits and feeders less in dry locations and in slabs above grade level.

PART 2 – PRODUCTS

2.1 Products for Raceways

- A. PVC conduits, fittings, couplings, adapters, and accessories shall be UL listed and approved for use with 90 degree Celsius conductors. The UL label shall be affixed to each ten foot length of conduit and each fitting. Conduits shall comply with NEMA Specification TC-2 and UL 651. Fittings shall comply with NEMA TC-3 and UL 514b.
- B. PVC-coated conduits, fittings, couplings, adapters, and accessories shall be UL listed with PVC as the primary corrosion protection. They shall be hot dipped galvanized rigid steel conduit with threads electro-galvanized after cutting. The conduit shall meet UL 6. The fittings shall meet UL 514B. The PVC coating shall be uniformly applied to the interior and exterior of all conduit and fittings. The coating shall be nominally 2 mils thick. The PVC coating shall extend one pipe diameter or two inches, whichever is less, at every male fitting except unions to fit over the joining female connection. Couplings shall contain a series of longitudinal ribs, 40 mils in thickness, to protect the coating from damage by tools during installation. PVC-coated conduits shall be ETL Verified PVC-001. Fittings shall be manufactured to the same standard. PVC-coated conduit shall be Robroy Plastibond or approved equal.
- C. GRS conduits, fittings, couplings, adapters, and accessories shall be UL listed. They shall be hot-dipped galvanized steel. They shall meet the safety standards of UL 6, and shall be manufactured to ANSI C80.1. Threads shall be hot galvanized after cutting.
- D. EMT conduits, fittings, couplings, adapters, and accessories shall be UL listed. They shall be hot galvanized steel and shall be produced in accordance with UL 797 and ANSI C80.3. The inside shall be finished with a corrosion-resistant lubricating coating.
- E. Conduit fittings used with EMT conduits may be set screw indenter type or compression type. All metallic fittings for Rigid conduit shall be compression type fittings.
- F. Flexible metallic conduit shall be constructed of galvanized steel and shall be UL listed as compliant with UL 1 and UL 1479.

RACEWAYS, OUTLET BOXES AND JUNCTION BOXES FOR ELECTRICAL SYSTEMS

- G. Liquidtight flexible conduit shall be constructed of galvanized steel and shall be coated with a PVC jacket to resist liquids, dirt, grease, and oils. All fittings shall be designed, constructed, and installed to maintain the integrity of the liquidtight connections. Liquidtight flexible conduit shall comply with UL 360.

2.2 ACCEPTABLE MANUFACTURERS FOR OUTLET BOXES AND JUNCTION BOXES.

- A. Outlet boxes and junction boxes shall be manufactured by Raco, Steel City, Crouse Hinds, or Appleton.

PART 3 – EXECUTION

3.1 CONDUIT EXECUTION

- A. Conduits run underground shall be buried no less than 24" deep. Services and primary conduits feeding transformers shall be buried no less than 48" deep.
- B. **Do not install conduits in or below ground floor slabs, except for service conduits, site lighting, and where specifically indicated on the drawings.**
- C. Do not install conduits within 6" of the deck where a screw down type roof system is utilized.
- D. PVC-coated conduits may be field-bent provided that manufacturer-approved tools are used. Individuals installing PVC-coated conduits shall be trained for installation by factory-certified trainers. Provide evidence of training with equipment brochures.
- E. Support and install all conduits per the latest edition of the National Electrical Code. Support groups of conduits with electrical strut supported by threaded rods anchored to the building structure. Supports shall be designed to hold no less than twice the weight of the conduit and conductors to be supported plus an additional 250 pounds at midspan.
- F. All conduits shall be grouped and run parallel to each other and to building walls.
- G. All conduits shall be assembled according to the manufacturer's instructions.
- H. Conduits run underground shall be assembled to be watertight.
- I. Cap all conduits during installation. Pull a mandrel sized for that conduit and a cleaning brush through each conduit before installation of any conductors.
- J. Conduits that are obviously damaged and field bends that are obviously out of round shall be replaced.
- K. Provide final connections to equipment with flexible metallic conduit. In wet or damp locations, use liquidtight flexible conduit. Flexible conduit shall not exceed 72".
- L. Terminate conduits entering boxes with a locknut inside the box and a locknut outside the box. Provide protective bushings on all conduit threads. Use watertight hubs where conduit terminations are exposed to moisture.
- M. Use grounding bushings on all feeder conduits, all underground conduits, and where required by the National Electrical Code.
- N. Conduits shall be run no closer than 12" to hot water pipes.

- O. Where conduits are run through the ceiling and are required to make connections to equipment within the room that is not located near a wall, support the conduit from the structural ceiling and provide a flange bolted to the floor. Install a tee conduit fitting in the vertical run of conduit, and make the connection to the equipment with a piece of flexible conduit extending from the tee conduit fitting to the equipment.
 - P. Provide expansion fittings where conduits cross building expansion joints. Provide grounding jumpers between the conduits.
 - Q. Provide EMT conduit sleeves where conduits pass through walls, floors, or footings sized a minimum of two nominal trade sizes larger than the conduit that must pass through the sleeve.
 - R. Equip all empty conduits with a pullwire or string capable of withstanding 200 pounds of pulling tension.
- 3.2 Execution for Outlet Boxes and Junction Boxes.
- A. All devices shall be flush mounted unless specific written permission is obtained from the Engineer for a particular device in a particular location.
 - B. Install outlet boxes in walls, and provide plaster rings such that wall finish contractor's finish is flush against the edge of the plaster ring. Workmanship will not be accepted where the hole in the wall shows behind the cover plate, or the wall finish is uneven or unpainted at the edge of the cover plate.
 - C. Use round or square ceiling outlet boxes as required for the device being installed. The ceiling shall be finished flush against the box; the fixture shall completely cover the box and mount tight against the ceiling. Coordinate the requirements of the fixture prior to installing the box.
 - D. Provide junction boxes, pull boxes, and conduit fittings where required by the NEC to limit the number of bends in the raceway, and where required to prevent damage to conductors due to long runs.
 - E. Junction boxes and pull boxes installed in the ground outside shall be Quazite Composolite or approved equal. Mount the boxes over 24" of washed gravel fill. If splices are to be made inside the boxes, the boxes shall be of the type furnished with a bottom, and all conduit connections shall be watertight. In addition, all conductor splices shall be made watertight using an appropriate splice kit as manufactured by 3M, or an approved equal.

END OF SECTION

SECTION 26.0923

SWITCHES AND RECEPTACLES

PART 1 – GENERAL

Furnish and install all switches and receptacles in accordance with this specification and the requirements of the NEC.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

Switches and receptacles shall be manufactured by Hubbell, Cooper Wiring Devices, Leviton, or Pass & Seymour.

2.2 GENERAL

- A. Switches and receptacles shall be specification grade. They shall have ampacity and voltage ratings suitable for the application in which they are used.
- B. Consult architect or engineer for device colors prior to ordering devices.
- C. Provide brushed stainless steel cover plates for all devices. A single cover plate shall cover all devices in one box.
- D. Light switches shall be 20 Ampere, 120-277V back-wired and side-wired toggle switches. They shall be rated up to 2 HP at 240V. Each switch shall be equipped with a grounding screw. Switches shall be Hubbell CSB series or approved equal.
- E. Duplex NEMA 5-20R receptacles shall be Hubbell HBL 5362A or approved equal.
- F. Duplex GFI NEMA 5-20R receptacles shall be Hubbell HBL GF5362A or approved equal.
- G. Weatherproof while-in-use cover plates shall be Teddico #34017-7 or approved equal. Cover plates shall be single gang, lockable, and constructed of heavy duty die cast metal.
- H. All 125V, 15 and 20 ampere receptacles installed in dwelling units shall be of the tamper-resistant type.
- I. All 15 and 20 ampere, 125 and 250V non-locking receptacles installed in wet or damp locations shall be listed as the weather-resistant type.
- J. Devices furnished in this Contract, but not listed above, shall be of the same standard of quality as those items listed.

PART 3 – EXECUTION

- 3.1 Flush mount all devices unless specific written permission is obtained from the Engineer for a particular device in a particular location.
- 3.2 Install all devices vertically unless the drawings specifically state that the particular device should be mounted horizontally.
- 3.3 Install receptacles with the ground slot up.

END OF SECTION

SECTION 26.2200 TRANSFORMERS

PART 1 – GENERAL

Provide all equipment, labor, and materials required for complete and operable installation of transformers as shown on the drawings and specified herein.

PART 2 – PRODUCTS

- 2.1 Transformers 1000 KVA and smaller shall be listed by UL. They shall conform to the requirements of ANSI/NFPA 70. They are to be manufactured and tested in accordance with NEMA ST20.
- 2.2 Transformers shall be designed for operation at 60 Hz. Unless otherwise shown on the drawings, each transformer shall be a three-phase unit with a 480 volt, delta connected primary, and a 208Y/120 volt secondary.
- 2.3 Transformer shall be of the energy-efficient type.
- 2.4 Where transformers are shown on the drawings to be K-rated, they shall be UL listed and labeled for the K-rating indicated based on the sum of fundamental and harmonics per UL 1561. They shall be listed for 115 degrees C average temperature rise. K-rated transformers shall have an impedance of 3% to 5% with a minimum reactance of 2% in order to help reduce neutral current when supplying loads with large amounts of third harmonic current.
- 2.5 All insulating materials shall exceed NEMA ST20 standards and be rated for 220 degrees Celsius according to UL's component recognized insulation system.
- 2.6 Transformers 15 KVA and larger shall be rated for 150 degrees C temperature rise above an ambient temperature of 40 degrees C. Transformers 25 KVA and above shall have four 2.5% full capacity primary taps (two above and two below).
- 2.7 The maximum temperature of the top of the enclosure shall not exceed 50 degrees C above an ambient temperature of 40 degrees C.
- 2.8 Furnish transformers located outside with factory-furnished weatherproof enclosures.
- 2.9 Transformer coils shall be of continuous wound construction.
- 2.10 Transformer cores are to be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable UL and NEC standards.
- 2.11 Transformers shall be ventilated and fabricated of heavy gauge sheet steel. The entire enclosure shall be finished utilizing a continuous process of degreasing, cleaning and phosphatizing, followed by electrostatic deposition of polymer polyester powder coating and baking to provide a uniform coating of all edges and surfaces.
- 2.12 Sound levels shall be warranted by the manufacturer not to exceed the following:
 -) 15 to 50 KVA – 45 dB
 -) 51 to 150 KVA – 50 dB
 -) 151 to 300 KVA – 55 dB
 -) 301 to 500 KVA – 60 dB
 -) 501 to 700 KVA – 62 dB
 -) 701 to 1000 KVA – 64 dB

-) 1001 to 1500 KVA – 65 dB
-) 1501 to 2000 KVA – 66 dB

PART 3 – EXECUTION

- 3.1 Install transformers in strict compliance with the manufacturer's instructions and the latest version of the National Electrical Code.
- 3.2 Provide concrete housekeeping pads for transformers mounted indoors. Housekeeping pads shall consist of 3.5" thick pads containing #4 reinforcing bars on 6" centers in both horizontal directions in the center of 3000 psi concrete. Where transformers are located outside, the pad shall extend at least 6" above grade and shall have a 12" wide footing at least 4" below the frost line; the footing shall be a minimum of 12" deep.
- 3.3 Transformers not exceeding 75 KVA may be wall-mounted where sufficient proof is provided that the structure can support the weight and where factory-provided wall brackets are used.

END OF SECTION

SECTION 26.2400 **PANELBOARDS**

PART 1 – GENERAL

- 1.1 Furnish and install all panelboards, complete with their circuit breakers, phase buses, neutral buses, ground buses, structural supports, and other equipment necessary for complete systems.
- 1.2 The equipment vendor shall perform all calculations necessary and provide complete Arc Flash Labels as required by the National Electrical Cod (NEC) and the drawings. Note: The drawings typically require more detail than required by the NEC.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Panelboards shall be designed, manufactured, and tested to be in compliance with NEMA PB 1, UL 50, UL 67, UL 489, NFPA 70, and the ASTM.
- B. Circuit breakers shall be designed, manufactured, and tested to be in compliance with NEMA AB 1, UL 489, and Federal Specification W-C-375B/GEN.
- C. Panelboards shall be UL listed for service entrance where used for that purpose.
- D. Panelboard ampere interrupting current (AIC) ratings shall equal the lowest rated device in the panelboard. Provide panelboards with the AIC ratings shown on the Contract Drawings. Buses shall be braced to withstand the AIC rating shown on the drawings. Series ratings shall only be used where shown on the panelboard schedules.
- E. All panelboards shall be furnished with dead-front, door-in-door construction.
- F. Lug locations shall be determined during the creation of shop drawings for proper arrangement with the raceway system.
- G. Buses shall be constructed of 98% conductivity copper or equivalently rated aluminum.
- H. Panelboard enclosures shall be NEMA 1 when they are to be mounted indoors, and NEMA 3R when they are to be mounted outdoors. Provide special enclosures where shown on the Contract Drawings.

2.2 ACCEPTABLE MANUFACTURERS

Panelboards shall be manufactured by Siemens, Square D, General Electric, or Cutler Hammer.

2.3 PANELBOARD CLASSES

- A. Power distribution panelboards shall be available with mains and branch devices up to 1200 amperes. AIC ratings shall be available up to 200,000 Amperes. Power distribution panelboards shall be equipped with a nameplate containing the appropriate system voltage, number of wires, and number of phases for the system on which they are installed.

- B. In 480Vac and less applications where a main breaker not exceeding 600 Amperes is required, the AIC rating does not exceed 65,000 Amperes, and no branch breakers exceed 125Amperes, Square D NF and equivalent panelboards may be used.
- C. In 480Vac and less applications where a main breaker not exceeding 225 Amperes is required, the AIC rating does not exceed 14,000 Amperes, and no branch breakers exceed 100Amperes, Square D NEHB and equivalent panelboards may be used.
- D. In 240Vac and less applications where a main breaker not exceeding 400 Amperes or main lugs not exceeding 600 Amperes is required, the AIC rating does not exceed 22,000 Amperes, and no branch breakers exceed 125 Amperes, Square D NQOD and equivalent panelboards may be used.

2.4 CIRCUIT BREAKERS

- A. Circuit breakers shall be thermal magnetic, molded-case with quick-make, quick-break contact action. They shall have thermal and magnetic tripping elements on each pole. Breakers with multiple poles shall have common tripping of all poles. Circuit breaker ampere ratings shall be stamped on the handle. Interrupting ratings of the circuit breakers shall be equivalent to the specified AIC rating of the panelboard. Breakers handles shall reside in a position between "ON" and "OFF" after a trip condition. Breakers shall be rated HACR when used for heating, air-conditioning, and refrigeration; HID when used with High Intensity Discharge fixtures; and shall be rated SWD when used for switching duty.
- B. Circuit breaker sizes for motor loads are based on Square D recommendations for use of their breakers at the motor horsepower listed on the mechanical drawings. If equipment is used other than Square D, adjust breaker sizes per the manufacturer's recommendations.
- C. Each circuit breaker supplying a multiwire branch circuit shall be installed with a manufacturer supplied handle tie to simultaneously disconnect all ungrounded conductors. Each multiwire branch circuit shall comply with NEC article 210.4.
- D. Circuit breakers with slash ratings, such as 120/240V or 480Y/277V, shall be used in solidly grounded systems where the nominal voltage of any conductor to ground does not exceed the lower of the two values of the breaker's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the circuit breaker's voltage rating.
- E. Circuit breakers with straight voltage ratings, such as 240V or 480V, shall be used in systems other than solidly grounded systems (Corner-Grounded Delta, Ungrounded, Impedance Grounded, etc.) where the nominal voltage between any two conductors does not exceed the circuit breaker's voltage rating. A two-pole circuit breaker shall not be used to protect a three-phase, Corner-Grounded Delta system unless the circuit breaker is marked 1 Φ -3 Φ .

PART 3 – EXECUTION

- 3.1 Install panelboards in complete compliance with all manufacturers' installation instructions.
- 3.2 Install conductors neatly in panelboards. Group and tie-wrap circuits that share a common neutral.
- 3.3 Number circuits exactly as shown on the contract drawings.

END OF SECTION

DISCONNECTS AND SEPARATELY-MOUNTED CIRCUIT BREAKERS

PART 1 – GENERAL

Furnish and install all disconnects and separately mounted circuit breakers as shown on the drawings, specified herein, and required by the NEC.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Disconnects shall be of the heavy-duty type, and shall be UL listed for service entrance use. They shall meet or exceed the requirements of NEMA Standard KS1. Provide fuses sized to appropriately protect the load served. Equipment manufacturer's recommendations shall take precedence over the Contract Drawings.
- B. Fuses shall be dual element, time-delay, Class J fuses. They shall be Bussman Low-Peak or approved equal.
- C. Circuit breakers shall be thermal magnetic, molded-case with quick-make, quick-break contact action. They shall have thermal and magnetic tripping elements on each pole. Breakers with multiple poles shall have common tripping of all poles. Circuit breaker ampere ratings shall be stamped on the handle. Interrupting ratings of the circuit breakers shall be equivalent to the specified AIC rating of the panelboard. Breakers handles shall reside in a position between "ON" and "OFF" after a trip condition. Breakers shall be rated HACR when used for heating, air-conditioning, and refrigeration; HID when used with High Intensity Discharge fixtures; and shall be rated SWD when used for switching duty.
- D. Circuit breaker sizes for motor loads are based on Square D recommendations for use of their breakers at the motor horsepower listed on the mechanical drawings. If equipment is used other than Square D, adjust breaker sizes per the manufacturer's recommendations.
- E. Circuit breakers with slash ratings, such as 120/240V or 480Y/277V, shall be used in solidly grounded systems where the nominal voltage of any conductor to ground does not exceed the lower of the two values of the breaker's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the circuit breaker's voltage rating.
- F. Circuit breakers with straight voltage ratings, such as 240V or 480V, shall be used in systems other than solidly grounded systems (Corner-Grounded Delta, Ungrounded, Impedance Grounded, etc.) where the nominal voltage between any two conductors does not exceed the circuit breaker's voltage rating. A two-pole circuit breaker shall not be used to protect a three-phase, Corner-Grounded Delta system unless the circuit breaker is marked 1 Φ -3 Φ .
- G. Disconnect and individually-mounted circuit breaker ampere interrupting current (AIC) ratings shall equal the rating of the panelboard from which they are fed unless otherwise noted.
- H. Buses shall be constructed of 98% conductivity copper or equivalently rated aluminum.
- I. Switches shall be horsepower rated where used to serve motors.
- J. Enclosures shall be NEMA 1 when they are to be mounted indoors, NEMA 3R when they are to be mounted outdoors, and NEMA 4X where they are subject to washdown. Provide special enclosures where shown on the Contract Drawings.

2.2 ACCEPTABLE MANUFACTURERS

Disconnects and separately-mounted circuit breakers shall be manufactured by Siemens, Square D, General Electric, or Cutler Hammer.

PART 3 – EXECUTION

- 3.1 Install disconnects and individually-mounted circuit breakers in complete compliance with all manufacturers' installation instructions. Where necessary, provide structural supports and bracing for installation.
- 3.2 Disconnects are to be surface-mounted.
- 3.3 Individually-mounted circuit breakers are to be flush-mounted unless otherwise shown.

END OF SECTION

GENERAL COMMUNICATION SYSTEMS REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, apply to this Section.
- B. Communication Systems complete including cabling, special backboxes, hardware and all other required devices and equipment.
- C. Installation of system equipment per specifications
- D. To supply in a timely manner to the electrical contractor special backboxes for installation as required.
- E. Coordinate wireway, raceway, power, and outlet requirements with the builder and the electrical contractor.
- F. Communication Systems Contractors shall provide and install prior to cable installation plastic
 - 1. snap in bushings at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves to protect the cabling from damage.
 - a. Furnishing of all required materials, equipment, tools, scaffolding, labor, and transportation necessary for the complete installation of the communication systems as shown on the drawings and as specified herein.
 - 1) Cable pathways, conduit, and cable support systems shall be complete with bushings, deburred, cleaned, and secure prior to installation of cable
 - 2) It is the intent of these specifications to provide complete installations although every item necessary may not be specifically mentioned or shown.

1.2 WORK TO BE INCLUDED BY THE ELECTRICAL CONTRACTOR IN BASE CONTRACT

- A. PROPOSAL
- B. Provide utility services conduit as outlined on drawings as required.
- C. All required conduit for accessibility to attic space.
- D. Furnishing and installation of all required standard back boxes and conduit.
- E. Installation of special back boxes supplied by the Division 27 contractor(s).
- F. Provide equipment-mounting boards as outlined on drawings.
- G. Provide 120-volt power and hook-up to equipment provided in Division 27.
- H. Coordination of requirements of Division 27 with the Builder.

1.3 WORK NOT INCLUDED

- A. Contractors shall make no agreement that obligates the Owner to pay any company providing communications, monitoring, or other services. Contractors shall not make selection, purchase, or installation of interconnect instruments/equipment to be used on this project.

1.4 RELATED SECTIONS

- A. The conditions of the Division 0 and Division 1 requirements, and the contract requirements that include the General Conditions and the Supplementary Conditions apply to work of this division.

1.5 OWNER FURNISHED CONTRACTOR INSTALLED (OFCI) EQUIPMENT

- A. The contractor shall verify that new and existing products and site conditions are satisfactory for installation or relocation of OFCI equipment. If unsatisfactory conditions exist or other discrepancies are identified, the contractor shall immediately document the conditions and notify the owner in writing.
- B. The contractor shall coordinate all required equipment schedule quantities and any dimensions or variations required to adapt to field conditions with the owner at the earliest possible date.
- C. The contractor shall verify compatibility, installation rough-in, mounting, and utility requirements for the scheduled OFCI equipment.

- D. The owner shall coordinate delivery dates with the builder to meet the construction schedule.
- E. The installation of items as identified in the plans and specifications as OFCI equipment shall conform to the provisions of the Contract Documents and shall be coordinated with the builder.
- F. Installation shall be performed by competent and trained workers in accordance with all applicable codes and governing regulations
- G. Installation, testing, and startup shall comply with the manufacturer's instructions.
- H. The contractor shall provide all miscellaneous hardware, structural support, cabling, fittings, etc. that is not included by the manufacture, but required for installation.
- I. The contractor shall clean and adjust all relocated and new OFCI products as necessary.
- J. All crating, packing materials, and debris and shall be properly disposed of off-site.
- K. Installation shall be subject to inspection by the architect, engineer, owner, and builder. The installer shall not proceed until any unsatisfactory conditions are corrected. Any damage caused by improper handling or installation procedures shall be corrected at no cost to the owner.
- L. For drop shipped equipment, the builder shall be the consignee and shall have a representative on site for coordination of delivery, to receive shipments, and to inspect each shipment for obvious signs of damage or shortages. The builder shall be responsible for all shipping damage claims, including hidden damage, refusal of shipment, and Return Authorization procedures. The builder shall provide secure storage, handling, and protection from the elements, prior to the contractors' acceptance for installation.
- M. For equipment stored at an owner's facility, the contractor shall load the equipment and provide transportation to the work site. Prior to loading, the contractor shall inspect the equipment for obvious signs of damage and document all quantities, noting shortages from the project requirements, indicating acceptance of the merchandise as is and in good order.
- N. The contractor shall conduct and properly document testing of all installed equipment to verify proper operation. When appropriate, on site operation and maintenance instruction shall be provided to the owner's personnel. This instruction shall include demonstration of proper use, maintenance, and cleaning procedures.
- O. The nature of the equipment procurement shall determine responsibility for resolving any claims with the manufacturer or supplier relating to defects in material or workmanship and warranty claims. The party that purchased the equipment shall resolve these issues.

1.6 CODES, STANDARDS, AND THIER ABBREVIATIONS

- A. General:
 - 1. Perform all work in strict accordance with the requirements and recommendations stated in the codes and standards except when requirements are exceeded by the contract documents.
 - 2. In addition to the requirements outlined in other sections of the specifications the following standards are imposed as applicable to the work in each instance:
 - a. OSHA Safety and Health Regulations for Construction.
 - b. NFPA No. 70 National Electrical Code.
 - c. NESC National Electrical Safety Code, ANSI Standard C2.
 - d. NEIS National Electrical Installation Standards.
 - e. Local Codes and Ordinances.
 - 1) Where local codes or practices exceed or conflict with the NEC, it shall be the Contractor's responsibility to perform the work in accordance with the local code prevailing and local interpretations thereof. Any such additional work shall be performed at no additional cost to the Owner.
 - 2) Materials and components shall be UL listed and labeled by Underwriters Laboratories, Inc. for the intended use under the latest appropriate testing standard.
 - 3) The Contractor shall obtain all permits required to commence work and, upon completion of the Work, obtain and deliver to the Owner's Representative a Certificate of Inspection and

GENERAL COMMUNICATION SYSTEMS REQUIREMENTS

Approval from the State Board of Fire Underwriters and other authorities having jurisdiction. The Contractor shall pay required permit fees.

- 4) List of Associations and Standards:
 - (a) Americans with Disabilities Act.
 - (b) ANSI: American National Standards Institute, 1430 Broadway; New York, NY 10018.
 - (c) ASTM: American Society for Testing and Materials, 1916 Race Street; Philadelphia, PA 19103.
 - (d) BICSI: (RCDD5 Standards), 8610 Hidden River Parkway, Tampa, FL 33637
 - (e) Certified Ballast Manufacturers Association, 2116 Keith Building; Cleveland, Ohio 44115.
 - (f) IEEE: Institute of Electrical and Electronics Engineers, 345 East 47th Street; New York, NY 10017.
 - (g) Insulated Cable Engineers Association, P.O. Box P, South Yarmouth, MA 02664.
 - (h) National Electrical Code; NFPA No. 70.
 - (i) NECA: National Electrical Contractors Association, Inc., 7315 Wisconsin Ave.; Washington, DC 20014.
 - (j) NEMA: National Electrical Manufacturers Association, 155 East 44th Street; New York, NY 10017.
 - (k) National Electrical Safety Code, ANSI Standard C2.
 - (l) National Fire Protection Association, 60 Batterymarch Street; Boston, MA 02110.
 - (m) Occupational Safety and Health Administration, US Department of Labor; Washington, DC 20402.
 - (n) Underwriters Laboratories, Inc., 333 Pfingsten Road; Northbrook, IL 60062.
- 5) Nothing in the Contract Documents shall be construed to permit work not conforming to these codes.
- 6) When two or more codes or standards are applicable to the same work, then the stricter code or standard shall govern.
- 7) The date of the code or standard is that in effect on the date of issue stated on the contract documents, except when a particular publication date is specified.
- 8) The Contractor shall comply with all State, Federal, NFPA, local codes and ordinances that may alter any part of the plans or specifications. The Contractor shall bear all costs for correcting any deficiencies due to non-compliance.
- 9) Where local codes and ordinances are not in writing or on record but local precedence have been set, the Owner shall pay for any additional resulting cost

1.7 DEFINITIONS

- A. Approval: It is understood that approval must be obtained from the Architect in writing before proceeding with the proposed work. Approval by the Architect of any changes, submitted by the Contractor, will be considered as general only to aid the Contractor in expediting his work.
- B. The Builder: The primary contractor engaged to oversee the construction project. They may be technically described as a Construction Manager, General Contractor, Managing Construction Contractor, et cetera.
- C. The Contractor: The Contractor engaged to execute the work included a particular section only, although he may be technically described as a Subcontractor to the Builder. If the Contractor, engaged to execute said work, employs Sub-Contractors to perform various portions of the work included under a particular Section, they shall be held responsible for the execution of this work, in full conformity with Contract Document requirements. The Contractor shall cooperate at all times and shall be responsible for the satisfactory cooperation of his Subcontractors with the other Contractors on the job so that all of the various sections and phases of work may be properly coordinated without unnecessary delays or damage.
- D. The Electrical Contractor: The Electrical Contractor shall be engaged to execute the work included. Contractor is required to provide a licensed electrical contractor to perform the necessary work.

- E. PDF file or .pdf: The filename extension associated with "Portable Document Format" files, which are multi-platform computer files in the ISO 32000-1:2008 open standard format developed and licensed by Adobe

Systems. These files are a digital electronic representation of text, documents, images, and technical drawings in a font and color-accurate fixed-layout format that is platform and display resolution independent. PDF files can be electronically transmitted, viewed, or printed with various free PDF reader application programs, and may allow markups/comments with various PDF editing application programs.

- F. Provide: Defined as requiring both the furnishing and installation of the item or facility indicated, complete in all respects and ready for operation unless otherwise specifically noted.

1.8 SCHEDULE OF VALUES, APPLICATION FOR PAYMENT

- A. The Contractor shall in accordance with the General Provisions of the Contract, including General and Supplementary Conditions, and Division 1, complete a Schedule of Values and Applications for Payment. When a portion of this work separately funded, including donations or an E-Rate program, the contractor shall accommodate this in the Schedule of Values and Applications for Payment. For E-Rate eligible portions of this work, the contractor will be required to participate in the E-Rate program, comply with all E-Rate regulations, and provide billing as needed. The contractor shall coordinate with the Owner to file Form 471 or latter edition and/or other forms as may be required.

1.9 WARRANTY

- A. The Contractor shall warranty his work against defective materials and workmanship for a period of one year from date of acceptance of the job.
- B. Neither the final payment nor any provisions in Contract Documents shall relieve the Contractor of the responsibility for faulty materials or workmanship.
- C. He shall remedy any defects due thereto, and pay for any damage to other work resulting there from, which shall appear within a period of one year from date of substantial completion.
- D. The Owner shall give notice of observed defects with reasonable promptness.
- E. This Warranty shall not be construed to include the normal maintenance of the various components of the system covered by these specifications.

1.10 SITE VISIT

- A. Before submitting a proposal, each proposed contractor shall examine all plans and specifications relating to the work, shall visit the site of the project, and become fully informed of the extent and character of the work required, including all required utilities.
- B. No consideration will be granted for any alleged misunderstanding of the materials to be furnished or the amount of work to be done, it being fully understood that the tender of a proposal carries with it the agreement to all items and conditions referred to herein, or indicated on the accompanying plans or required by nature of the site of which may be fairly implied as essential to the execution and completion of any and all parts of the work.

1.11 SUBMITTALS

- A. Provide a complete submittal for each section as specified.
- B. Submit complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval. Partial submittals are not acceptable for review. Each submittal shall include a dated transmittal.
- C. Submittal may be electronically transmitted in PDF file format (preferred) or paper copies may be provided in quantities indicated in Division 1. Paper copies shall be organized including index tabs in a 3-ring black binder of sufficient size.
- D. Each Product data submittal shall include:

GENERAL COMMUNICATION SYSTEMS REQUIREMENTS

1. A cover sheet with the name and location of the project, the name, address, and telephone number of the Contractor, and the name, address, and telephone number of the submitting sub-contractor. Include on or after the cover sheet sufficient space for review stamps.
2. An indication of any deviations from Contract Document requirements, including variations and limitations. Show any revisions to equipment layout required by use of selected equipment.
3. A product data index and complete equipment list including for each product submitted for approval the manufactures name and part number, including options and selections.
4. Cut-sheets or catalog data illustrating the physical appearance, size, function, compatibility, standards compliance, and other relevant characteristics of each product on the equipment list. Indicate by prominent notation (an arrow, circle, or other means) on each sheet the exact product and options being submitted.
5. Submit design data, when the scope of work requires, including calculations, schematics, risers, sequences, or other data.
6. When the contract requires extended product warranties, submit a sample of warranty language.
7. Any resubmittal shall include a complete revised equipment list and any product data that is revised.
 - a. Submit shop or coordination drawings, when specified or the required for the scope of work, which include information that will allow to the Contractor to coordinate interdisciplinary work and when necessary guide the manufacturer or fabricator in producing the product. Shop or coordination drawings shall be specifically prepared to illustrate the submitted portion of work, this may require diagrams, schedules, details, and accurate to scale equipment and device layouts prepared using a CAD or BIM engineering drawing program.
 - b. The Engineer's review of submittals is only for confirmation of adherence to design of project and does not relieve the Contractor of final responsibility for furnishing all materials requirefor a complete working system and in complying with the Contract Documents in all respects.

1.12 PROJECT RECORD DOCUMENTS

- A. The Contractor shall keep a set of plans on the job, noting daily all changes made in connection with the final installation including exact dimensioned locations of all new and uncovered existing utility piping outside the building.
- B. Upon submitting his request for final payment, he shall turn over to the Architect/Engineer, for subsequent transmittal to the Owner revised plans showing "as installed" work.
- C. In addition to the above, the Contractor shall accumulate during the jobs' progress the following data in PDF file format (preferred) or paper copies to be turned over to the Architect/Engineer for checking and subsequent delivery to the Owner:
 1. All warranties, guarantees, and manufacturer's directions on equipment and material covered by the Contract.
 2. PDF file or paper copies of all Shop Drawing prints and CAD or BIM engineering drawing program files.
 3. Any software programs, data/programming files, passwords, special interface cables, or keys that may be needed to maintain or access equipment.
 4. Set of operating instructions. Operating instructions shall also include recommended maintenance and seasonal changeover procedures.
 5. Any and all other data and/or plans required during construction.
 6. Repair parts lists of all major items and equipment including name, address, and telephone number of local supplier or agent.
 7. The first page, or pages, shall have the names, addresses, and telephone numbers of the following:
 - a. Builder and all Contractors.
 - b. Major Equipment Suppliers
 - c. Submit communication systems warranties.

1.13 TRAINING

- A. Upon completion of the work and at a time designated by the Architect, provide formal training sessions for the Owner's operating personnel to include location, operation, and maintenance of all communication systems equipment and systems.
- B. See other sections for time requirements.

1.14 PLANS AND SPECIFICATIONS

- A. The intent of the project drawings is to establish the types of systems and functions, but not to set forth each item essential to the functioning of the system.
- B. Electrical drawings are generally diagrammatic and show approximate location and extent of work.
- C. Install the work complete including minor details necessary to perform the function indicated. Provide communication systems (including all hook-ups) complete in every respect and ready to operate.
- D. If clarification is needed, consult the Architect/Engineer.
- E. Review pertinent drawings and adjust the work to conditions shown. Where discrepancies occur between drawings, specifications, and actual field conditions, immediately notify the Architect/Engineer for his interpretation.
- F. The Architect/Engineer reserves the right to make any reasonable change in the location of any part of this work without additional cost to the Owner.

1.15 PRODUCT SUBSTITUTIONS

- A. Descriptions and details, acceptable manufacturers' names listed, and specific manufacturer and model number items indicated in the plans and specifications shall establish a standard of quality, function, and design. Manufacturers and model numbers listed "no exceptions" shall not be substituted without specific notice in an addendum. Otherwise, where a specific manufacturer's product is indicated, products of other manufacturers listed as acceptable may be submitted for approval based on the substitute product being, in the opinion of the Engineer, of equivalent or better quality than that of the product specified.
- B. Proposed contractors wishing to propose systems which differ in manufacturer, features, functions, or operating characteristics from those outlined in these specifications must do so in writing to the specifying authority at least ten (10) days prior to the proposal opening.
- C. For manufacturers equipment or models other than that specified, the proposed contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment. Proposals must include detailed information showing all deviations from the system as specified and include relevant technical and cost data. This shall include a complete description of the proposed substitution, drawings, catalog cuts, performance data, test data, or any other data or information necessary for evaluation.
- D. The Engineer will consider all such submittals and the Architect will issue an addendum listing items that the Engineer considers acceptable. Only such items as specified or approved as acceptable will be installed on this project.
- E. Substitute products for which the proposed contractor does not obtain prior approval will not be considered acceptable for this project. Final approval of the alternate system shall be based on the decision of the Owner and Architect. Prior approval to make a proposal for this project does not automatically insure the system will be an acceptable equivalent.
- F. The Contractors' proposal represents that the contract proposal price is based solely upon the materials, equipment, and labor described in the Contract Proposal Documents (including addenda, if any) and that he contemplates no substitutions or extras.
- G. The manufacturer of the proposed substitute unit shall provide samples for evaluation, when required, at no charge and non-returnable.
- H. Requests for substitution are understood to mean that the Contractor:

GENERAL COMMUNICATION SYSTEMS REQUIREMENTS

1. Has personally investigated the proposed substitution and determined that it is equivalent or superior in all respects to that specified.
2. Will provide the same guarantee for the substitution that he would for that specified.
3. Will, at no cost to the Owner, replace the substitute item with the specified product if the substitute item fails to perform satisfactorily.
4. After Award of the Contract, substitutions will be considered only under one or more of the following circumstances:
 - a. The substitution is required for compliance with subsequent interpretations of code or insurance requirements.
 - b. The specified product is unavailable through no fault of the Contractor.
 - c. The manufacturer refuses to warranty the specified products as required.
 - d. Subsequent information indicates that the specified product is unable to perform properly or to fit in the designated space.
 - e. In the Engineer's sole judgment, the substitution would be in the Owner's best interest.
 - f. Revisions to the electrical system caused by substitutions shall be under the supervision of the Engineer, at a standard hourly rate charged by the Engineer. Charges from the Engineer, Architect, and Electrical Contractor shall be paid by the Contractor originating the changes.

1.16 FUTURE USE CABLING

- A. When cabling is installed for future use, it shall be identified with a tag of sufficient durability to withstand the environment involved.
- B. Locations and Existing Conditions:
 1. Location and condition of any existing equipment or services, when shown, have been obtained from substantially reliable sources, are shown as a general guide only, without guarantees as to accuracy.
 2. The Contractor will examine the site, verify all requirements, service points, and availability of all services required to complete this project. No consideration will be granted for any alleged misunderstanding of the materials and labor to be provided as necessitated by nature of the site including those items that may be fairly implied as essential to the execution and completion of any and all parts of this project.

1.17 PROTECTION OF EQUIPMENT AND MATERIALS

- A. The Contractor shall take such precautions as may be necessary to protect his apparatus from damage.
- B. This shall include the creation of all required temporary shelters to protect any apparatus above the floor of the construction and the covering of apparatus in the completed building with tarpaulins or other protective covering.
- C. Failure to comply with the above to the satisfaction of the Owner's inspector will be sufficient cause for the rejection of the equipment in question and its complete replacement by the Contractor.

1.18 FINAL OBSERVATION

- A. It shall be the duty of the Contractor to make a careful observation trip of the entire project, assuring themselves that the work on the project is ready for final acceptance before calling upon the Architect/Engineer to make a final observation.
- B. To avoid delay of final acceptance of the work, the Contractor shall have all necessary bonds, warranties, receipts, affidavits, et cetera, called for in the various articles of these specifications, prepared and signed in advance, together with a letter of transmittal, listing each paper included, and shall deliver the same to the Architect/Engineer at or before the time of said final observation. The Contractor is cautioned to check over each bond, receipt, et cetera, before preparing for submission to verify that the terms check with the requirements of the specifications.
- C. The following and other provision of Division 1 General Conditions will be required at time of final completion:
 1. Final clean up completed.
 2. All systems are fully operational, all material and devices installed.
 3. As built (as installed) drawings and operations manuals

1.19 PROHIBITED MATERIALS

- A. No new asbestos, lead, or materials containing these substances shall be permitted in this project. The Contractor shall consult the Architect concerning these materials if their presence is suspected. All work in or around existing asbestos or lead materials is at the sole risk of the Contractor and his personnel.

1.20 CUTTING AND PATCHING

- A. Notify the Builder sufficiently ahead of construction of any floors, walls, ceiling, roof, et cetera, of any openings that will be required for his work.
- B. The Contractor shall see that all sleeves required for his work are set at proper times to avoid delay of the job.
- C. All necessary cutting of walls, floors, partitions, ceilings, et cetera, as required for the proper installation of the work under this Contract shall be done at the Subcontractor or at the Subcontractor's expense in a neat and workmanlike manner, and as approved by the Architect/Engineer.
- D. Patching of openings and/or alterations shall be provided by the communications Subcontractor or at the Subcontractor's expense in an approved manner.
- E. No joists, beams, girders, or columns shall be cut by any Contractor without first obtaining written permission of the Architect/Engineer.
- F. All openings in firewalls and floors shall be completely sealed after installation for a completely airtight installation. Sealing material shall be non-combustible and UL approved. The installed sealing assembly shall not cause the fire rating of the penetrated structure to be decreased.
- G. All openings in exterior walls shall be sealed watertight.
- H. Seal voids around conduits penetrating fire-rated assemblies and partitions using fire stopping materials and methods in accordance with NFPA and local codes.

1.21 MANUFACTURERS' INSTRUCTIONS

- A. All equipment and devices shall be installed in accordance with the drawings and specifications, manufacturer's instructions, and applicable codes.
- B. Where specifications call for installation of a product to be in accordance with manufacturer's instructions and/or where manufacturer's instructions are required for installation of a product, it shall be the contractor's responsibility to obtain the necessary applicable manufacturer's instructions and install the product in accordance with the manufacturer's instructions.
- C. It shall be the Contractor's responsibility to install all equipment, materials, and devices shown on the plans and as called out in these specifications even if manufacturer's instructions are absolutely unattainable.

1.22 INSTALLATION

- A. Cooperation with trades of adjacent, related or affected materials or operations, and or trades performing continuations of this work under subsequent contracts are considered a part of this work. In order to effect timely and accurate placing of work and to bring together, in the proper and correct sequence, the work of such trades, including work provided under a Division allowance.
- B. The Communications Contractor shall coordinate installation of the communication systems with the Builder, Electrical, Mechanical, and Plumbing Contractors to insure a complete working system for the Owner.
- C. Where required for accessibility all conduit and boxes for all communication systems shall be provided by the Electrical contractor as specified, including systems in Division 27, any and all allowances shall be included. Normally low voltage wiring shall run open and supported in accessible attic space. All low voltage wiring in exposed areas such as gyms, stages, shops, and field houses shall be enclosed in conduit. Coordinate with, and verify with existing construction general contractor to provide required conduit and boxes at locations and heights as required.
- D. Conduit, innerduct, track, or raceway shall conceal and protect wiring in exposed areas, within walls, through in- accessible areas, floors, chases, under slab, crawlspaces, or underground.

GENERAL COMMUNICATION SYSTEMS REQUIREMENTS

- E. All conduit, duct, track, and raceway runs shall be spaced apart to allow for maintenance, such as the installation of couplings, without disturbing adjacent pathways.
- F. All work must be performed by workers skilled in their trade. The installation must be complete whether the work is concealed or exposed.
- G. Provide stainless screw/bolt hardware wherever stainless devices are used and in potentially wet areas.
- H. Coordinate the actual locations of devices and outlets and equipment with building features and mechanical equipment as indicated on architectural, structural, and mechanical drawings. Review with the Architect any proposed changes in outlet or equipment location. Relocation of devices, before installation, of up to 3 feet from the position indicated, may be directed without additional cost. Remove and relocate outlets placed in an unsuitable location when so requested by the Architect.

PART 2- PRODUCTS

2.1 NOT APPLICABLE

PART 3- EXECUTION

3.1 NOT APPLICABLE

END OF SECTION

AUDIO-VIDEO EQUIPMENT BRACKETS AND COAXIAL CABLING

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, apply to this Section.
- B. Provide all equipment, materials, labor, supervision, test equipment, and services necessary for or incidental to the installation of complete and operating Audio/Video Equipment Brackets and Coaxial Cabling installation built to commercial standards. Equipment shall be provided and installed as shown or indicated on the drawings and as specified.
- C. Equipment specified herein is designed to provide specific functional and operational characteristics. It is the responsibility of the Audio/Video Equipment Brackets and Coaxial Cabling Contractor to provide all features and functions as outlined in these specifications
- D. It shall be the responsibility of the Electrical contractor to provide and install all conduit systems, standard electrical boxes, and operating power for the system as outlined on the project drawings and as required for a complete and operational system. The Audio/Video Equipment Brackets and Coaxial Cabling Contractor shall coordinate all system requirements with and provide special back boxes to the Electrical Contractor prior to installation of conduit.
- E. Testing, as described in Part 3, for all requirements shall be performed with all equipment, cable runs, and wiring devices in place.
- F. Provide all documentation and training as outlined in these specifications.

1.2 RELATED SECTION

- A. Section 27 05 00 - General Communication Systems Requirements.

1.3 CODES AND REGULATIONS

- A. Perform all work in strict accordance with the requirements and recommendations stated in the codes and standards except when requirements are exceeded by the contract documents.
- B. The equipment, materials, and installation shall confirm to the latest version of all applicable codes, standards and regulations of authorities having jurisdiction including the following:
 - 1. NFPA 70, National Electrical Code.
 - 2. NFPA 72, National Fire Alarm Code.
 - 3. FCC Rules, Part 76.
 - 4. Americans with Disabilities Act.
 - 5. International Building Codes (IBC)
 - 6. Local and State Building Codes.
 - 7. All requirements of the local Authority Having Jurisdiction (AHJ).
 - 8. All applicable parts will be FCC Class B approved.
 - 9. All equipment, cable, devices, and accessories provided shall be listed and labeled by Underwriters Laboratories, Inc. for the intended use under the latest appropriate testing standard.

1.4 SUBMITTALS

- A. Submittal procedures: See section 27 05 00.
- B. Submit a complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval. Partial submittals are not acceptable for review. Each submittal shall include a dated transmittal.
- C. Submittal may be electronically transmitted in PDF file format (preferred) or paper copies may be provided in quantities indicated in Division 1. Paper copies shall be organized including index tabs in a 3-ring black binder of sufficient size.

- D. Product Data Submittal including special boxes, cable, and other material as requested by the Architect including:
 - 1. A cover sheet with the name and location of the project, the name, address, and telephone number of the Contractor, and the name, address, and telephone number of the submitting sub-contractor. Include on or after the cover sheet sufficient space for review stamps.
 - 2. An indication of any deviations from Contract Document requirements, including variations and limitations. Show any revisions to equipment layout required by use of selected equipment.
 - 3. A product data index and complete equipment list including for each product submitted for approval the manufactures name and part number, including options and selections.
 - 4. Cut-sheets or catalog data illustrating the physical appearance, size, function, compatibility, standards compliance, and other relevant characteristics of each product on the equipment list. Indicate by prominent notation (an arrow, circle, or other means) on each sheet the exact product and options being submitted.
 - 5. Submit design data, when the scope of work requires, including calculations, schematics, risers, sequences, or other data.
 - 6. Any resubmittal shall include a complete revised equipment list and any product data that is revised.
- E. Submit shop drawings locating all components and labeling of cable systems. Submit wiring diagrams of each system showing typical connections for all equipment, indicating circuit routing, cable type, and gauge. Shop or coordination drawings shall include information that will allow to the Contractor to coordinate interdisciplinary work and when necessary guide the manufacturer or fabricator in producing the product. Shop or coordination drawings shall be specifically prepared to illustrate the submitted portion of work, this may require diagrams, schedules, details, and accurate to scale equipment and device layouts prepared using a CAD or BIM engineering drawing program.

1.5 QUALIFICATIONS OF A PROPOSED CONTRACTOR

- A. Proposed contractors who do not currently possess the necessary qualifications, trained and experienced personnel, financial capacity, and meet the other requirements herein described will be disqualified.
- B. The proposed contractor, as a business entity, shall be an authorized and designated representative of the equipment manufacturer and shall have been actively engaged in the business of selling, installing, and servicing commercial building communication systems for a period of at least 5 years.
- C. Recently formed companies are acceptable only if specific pre-approval is requested, and granted by the Architect/Engineer, based on experience of key personnel, current and completed projects, and all licensing requirements are met 10 working days prior to the contract proposal date.
- D. The proposed Contractor shall have a service center within 60 miles of the job site, staffed with trained technicians who are qualified and licensed to supervise the installation, to be responsible that the system is installed as submitted, to conduct system start up and perform a 100 percent operational audit of all installed devices, to instruct the Owners representatives in the proper operation of the system, and to provide service throughout the warranty period.
- E. The proposed contractor shall be fully experienced in the design and installation of the system herein specified, and shall have a minimum of five projects in a similar scope of work and at least 10 years' experience in the scoreboard industry.
- F. The proposed Contractor shall not have any unresolved grievances or complaints of record regarding workmanship, code compliance, or service response. A Contractor that has any prior finding(s) of a code violation or has any litigation in process is unacceptable.
- G. The Proposed contractor shall employ full time local technicians and installers. The manufacturer shall maintain a full time factory employed service staff for product support and service.
- H. The ability of any proposed contractor to obtain plans and provide a performance bond shall not be regarded as the sole qualification of the Contractor's competency and responsibility to meet the requirements and obligations of the contract.

AUDIO-VIDEO EQUIPMENT BRACKETS AND COAXIAL CABLING

- I. The Builder shall be satisfied that a proposed Contractor meets all the requirements expressed herein before including the Contractor's proposal in the project.
- J. The Owner may investigate, as they deem necessary to determine the ability of the proposed Contractor to perform the work. The proposed Contractor shall furnish to the Owner with any information or data requested for this purpose.
- K. The Owner reserves the right to reject any contract proposal if the evidence submitted, or their investigation, fails to indicate that the Contractor is qualified to fulfill of any part of the contract or to complete the work contemplated therein.
- L. The Owner reserves the right to reject the proposal of any Contractor who has previously failed to perform properly, or complete on time, contracts of a similar nature.

PART 2- PRODUCTS

2.1 GENERAL

- A. Only representative equipment symbols have been shown on the contract drawings. Specific devices and wiring between equipment may not be shown.
- B. All devices provided shall be new and shall be the latest product of a manufacturer of established reputation and experience of quality electronic equipment. The manufacturer shall have supplied similar apparatus to comparable installations rendering satisfactory service for at least three years. All like devices shall be of the same manufacturer and model number.
- C. All basic equipment, cable, and wiring devices for which Underwriters' Laboratories (UL) standards are established for their intended use shall be UL listed and be so labeled, or bear equivalent labeling from a recognized certification laboratory acceptable to local authorities.
- D. All wire shall be UL listed for audio/video applications. Follow the manufacturer's instructions. All wire exposed in attic spaces shall be rated non-conduit per NEC.
- E. Both ends of all cables shall be labeled utilizing self-laminating polymer film non-smear, machine printed labels.
- F. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., cable shall not be supported by or lay on suspended ceilings). Fasteners and supports shall be adequate to support the required load.
- G. Installation subject to approval, inspection, and test of the Architect/Engineer.

2.2 ACCEPTABLE MANUFACTURES

- A. Descriptions and details, acceptable manufacturers' names listed and specific manufacturer and model number items indicated in the plans and specifications shall establish a standard of quality, function, and design. Manufacturers and model numbers listed "no exceptions" shall not be substituted without specific notice in an addendum. Otherwise, where a specific manufacturer's product is indicated, products of other manufacturers listed as acceptable may be submitted for approval based on the substitute product being, in the opinion of the Engineer, of equivalent or better quality than that of the product specified.
- B. Proposed contractors wishing to propose any product substitution must do so in writing to the specifying authority at least ten (10) days prior to the proposal opening.
- C. For manufacturers equipment or models other than that specified, the proposed contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment. Proposals must include detailed information showing all deviations from the system as specified.
- D. Substitute products for which the proposed contractor does not obtain prior approval will not be considered acceptable for this project. Final approval of alternate products shall be based on the decision of the Owner and Architect. Prior approval to make a proposal for this project does not automatically ensure products will be an acceptable equivalent.

- E. It is the responsibility of the Contractor to provide all features and functions as outlined in these specifications. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.
- F. The functions and features identified in this specification section are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

2.3 COLOR OF DEVICE/WALL PLATES

- A. Color of device/wall plates to be off-white, ivory, etc. to best match project light switches and electrical outlets, coordinate with the Electric Contractor.

2.4 FLAT SCREEN DISPLAY (FSD) WALL BRACKETS

- A. The flat screen displays are not included in the scope of work outlined in the section, however they are planned to be mounted on wall brackets as specified.
- B. At each flat screen display location indicated on the plans, provide a wall bracket with coaxial and data cabling drops.
- C. Flat screen Display Wall Mount Brackets: Provide Peerless-AV model number ST660 for 39" to 80" diagonal flat panel displays up to 200 lbs. VESA 800 x 400 pattern or equivalent wall mount bracket with security hardware and adjustable viewing angle 15° forward tilt to 5° backward tilt. Provide a Peerless-AV part number ACC415 Metal Stud Fastener Kit for metal stud walls. Provide all required hardware to support from structure.

2.5 COAXIAL CABLING

- A. Each cable run shall be direct from the MDF to each indicated outlet location without branching or junctions.
- B. Coaxial CATV cabling shall be outdoor and direct burial rated RF Trunk Cable Type RG-11/U coaxial CATV cable, 14 AWG copper covered steel center conductor, double shielded, 100% aluminum polyester foil coverage plus 61% (±5%) aluminum braid, 75 Ω nominal impedance, with flooding material and an overall sunlight resistant PE jacket, West Penn Wire No. 1110 or equivalent.
- C. Provide West Penn Wire No. CN-F11ALX Connectors for RG-11/U cable shall feature a one-piece body and separate center conductor pin, type 'F'.
- D. Wall Plates shall be feedthrough, RF shielded, Blonder-Tongue Model V-1GF-FT or equivalent.

2.6 CABLE AND EQUIPMENT INSTALLATION AND ATTCHMENTS

- A. System wiring and equipment installation shall be in accordance with good engineering practices as established by the EIA and the NEC. Wiring shall meet all state and local electrical code requirements.
- B. The support system shall provide a protective pathway to eliminate stress that could damage the cabling. The cable shall not be crushed, deformed, skinned, crimped, twisted, or formed into tight radius bends that could compromise the integrity of the cabling.
- C. Cable pathways, conduit, and cable support systems shall be complete with bushings, deburred, cleaned, and secure prior to installation of cable.
- D. All wiring shall test free from all grounds and shorts. All audio/video signal cable and devices shall be supported from the building structure and bundled. Do not attach any supports to joist bridging or other lightweight members. The support system shall provide a protective pathway to eliminate stress that could damage the cabling.
- E. The cable shall not be crushed, deformed, skinned, crimped, twisted, or formed into tight radius bends that could compromise the integrity of the cabling. Audio/video signal cables shall not be run loose on ceiling grid or ceiling tiles. Support shall be provided by mounting appropriate fasteners that may be loaded with multiple cables. Provided that the support rod or wire carries the weight load, the support assembly may attach to the ceiling grid for lateral stabilization. The required support wires for the ceiling grid or light fixtures shall not be utilized. Any fastener attached to the ceiling grid shall not interfere with inserting or removing ceiling tiles. All cabling and supports must be positioned at least 12 inches above the ceiling grid.

AUDIO-VIDEO EQUIPMENT BRACKETS AND COAXIAL CABLING

- F. Conduit, duct, or track shall be used for audio/video signal cable in exposed areas.

2.7 BUSHINGS

- A. Provide a plastic snap in bushing at each box opening, passage through a metal stud, and at the end of all open conduit stubs or sleeves prior to cable installation to protect the cabling from damage:
1. Box openings - Thomas & Betts Knockout Bushing Series 3210, or equivalent.
 2. Metal stud passage - Thomas & Betts Twist It Bushing Catalog Number SB1216-SC, or equivalent.
 3. Conduit ends - Thomas & Betts Anti-Short Bushing Series 390 or Tite-Bite Combination couplings Series 442, or equivalent.

2.8 J-HOOKS

- A. Attachments for cabling support shall be spaced at approximately 48 to 60 inches on center. The cable bundle shall not be allowed to sag more than 12 inches mid-span between attachments. All attachments shall be approved for Category 6 cabling. Attachments shall be sized as follows:
1. Bundles up to 3/4" dia. (8 4-pair UTP cables): 3/4" J-Hook, Panduit J-Pro JP75W-L20 series or equivalent by Caddy
 2. Bundles up to 1-5/16" dia. (15 4-pair UTP cables or one 1-1/4" innerduct): 1-5/16" JHook, Panduit J-Pro JP131W-L20 series or equivalent by Caddy
 3. Bundles up to 2" dia. (46 4-pair UTP cables): 2" J-Hook, Panduit J-Pro JP2W-L20 series or equivalent by Caddy
 4. Bundles up to 4" dia. (180 4-pair UTP cables): 2" J-Hook, Panduit J-Pro JP4W-X20 series or equivalent by Caddy
 5. Split bundles greater than 4" dia. or provide cable tray
- B. Do not mix different signal strength cables on the same J-Hook (i.e. fire alarm with data and telephone cable). Multiple J-Hooks can be placed on the same attachment point, up to the rated weight load of the attachment device.

2.9 CABLE TIE WRAPS

- A. Velcro hook cable ties shall be furnished and installed to attach wire bundles to supports and for appropriate wire management as required. Provide and install Panduit TAK-TY HLTP series cable ties with UL 94-V2 flammability rating, or equivalent.

PART 3- EXECUTION

3.1 TESTING, WARRANTY, SERVICE

- A. All equipment will carry a one year warranty or manufacturer's warranty whichever is greater.
- B. A qualified representative of the contractor shall supervise the final connections and testing of the system and it shall be subject to the final acceptance of the Architect/Engineer and Owner.
- C. The System Contractor shall make a thorough inspection of the complete installation to ensure the following:
1. Complete and functional system. Installed in accordance with manufacturer's instructions.
 2. All wiring shall test free from all grounds, crosses, and shorts.
 3. Testing for continuity and signal strength shall be performed and recorded for each outlet.
 4. A representative of the Owner shall be present for all testing. Testing shall verify design and performance requirements as specified.
- D. The contractor shall provide a warranty of the installed system against defects in material or workmanship for a period of one (1) year from the date of substantial completion. Any equipment or wiring shown to be defective shall be replaced, repaired, or adjusted free of charge. All labor and materials shall be provided at no expense to the Owner. All equipment will carry a one year warranty or manufacturer's warranty whichever is greater.

3.2 DRAWINGS, MANUALS, AND TRAINING

- A. As-built drawings and operating and maintenance manuals may be electronically transmitted in PDF file format (preferred) or paper copies may be provided in quantities indicated in Division 1. Paper copies shall be organized including index tabs in a 3-ring black binder of sufficient size.
- B. Upon completion of the installation, and prior to final inspection, the Contractor shall furnish as-built drawings.
- C. In addition, the contractor shall furnish complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets. Manuals shall include wiring diagrams to indicate internal wiring for each device and the interconnections between the items of equipment. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system. Provide a parts list with manufacturer and model number for commonly replaced parts. Include complete instructions for the inspection, testing, and maintenance of the system including wiring diagrams. Include manufacturer's operation, maintenance, and troubleshooting manuals. Include copies of manuals for each item that is powered or passive that impacts the system from an operational value or from a troubleshooting value. Also, copies of all programming sheets used to program the system. Maintain one (1) complete and up-to-date manual at the contractor's place of business for the life of the system.
- D. All cables shall have both ends labeled and included in the as built documentation. All cable paths and wiring methodology shall be documented.
- E. This contractor shall conduct formal on-site training sessions. Provide documented general instruction as follows:
- F. Provide instruction to the maintenance personnel to include the location, inspection, maintenance, testing, and operation of all system components. Provide a minimum of two (2) hours.
- G. Provide instruction to the designated users on the operation of the system and how to utilize the system to their best benefit. Provide a minimum of two (2) hours.

3.3 END SECTION

END OF SECTION

VIDEO SCOREBOARD AND RELATED SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. The General Provisions of the Contract, including General and Supplementary Conditions, and Division 0 and Division 1, apply to the work specified in this Section.
- B. Provide a complete system as herein specified and as indicated on plans. Including:
 - 1. Video Board
 - 2. Set of Play Clocks
 - 3. Controller Console / User Interface
 - 4. Sponsor Signs
- C. Provide all equipment, materials, labor, supervision, test equipment, and services necessary for or incidental to the installation of each complete and operating Video Replay System, Scoreboard System, Sound System, Camera, and Crew Intercom System, built to commercial standards. Equipment shall be provided and installed as shown or indicated on the drawings and as specified.
- D. Installing contractor shall be responsible for providing all interconnecting cabling, faceplates, terminations, testing, etc. as required for a complete and operating system. This shall also include any fiber cabling and transceivers as required to extend camera video signal from filming locations to equipment location in Pressbox. The designated filming locations are as follows:
 - 1. **South Corner of Press box 2nd Floor**
 - 2. **Home Radio Booth**
 - 3. **Top of Hill on the South Side of Field in Line with End Zone**
- E. Equipment specified herein is designed to provide specific functional and operational characteristics. It is the responsibility of the Scoreboard System Contractor to provide all features and functions as outlined in these specifications.
- F. It shall be the responsibility of the qualified Electrical Sub-Contractor to provide and install all conduit systems, standard electrical boxes, and operating power for the system as outlined herein and to connect with existing electrical services on site. The Video Replay System Contractor shall coordinate all system requirements with and provide special back boxes to a qualified Electrical Sub-Contractor prior to installation of conduit.
- G. Testing for all requirements shall be performed with all equipment, cable runs, and wiring devices in place.
- H. Provide a service contract and warranty as outlined in Part 3 of these specifications
- I. Provide all documentation and training as outlined in these specifications.

1.2 RELATED SECTION

- A. Section 27 05 00 - General Communication Systems Requirements.

1.3 CODES AND REGULATIONS

- A. Perform all work in strict accordance with the requirements and recommendations stated in the codes and standards except when requirements are exceeded by the contract documents.
- B. The equipment, materials, and installation shall conform to the latest version of all applicable codes, standards and regulations of authorities having jurisdiction including the following:
 - 1. NFPA 70, National Electrical Code.
 - 2. NFPA 101, Code for Safety to Life from Fire in Buildings and Structures.
 - 3. All applicable parts will be FCC Class B approved.
 - 4. Americans with Disabilities Act.
 - 5. International Building Codes (IBC).
 - 6. Local and State Building Codes.
 - 7. All requirements of the local Authority Having Jurisdiction (AHJ).

1.4 SUBMITTALS

- A. Submittal procedures: See Section 27 05 00.
- B. Submit a complete submittal package within 30 calendar days after award of this work for approval. Equipment is not to be ordered without approval. Partial submittals are not acceptable for review. Each submittal shall include a dated transmittal.
- C. Submittal may be electronically transmitted in PDF file format (preferred) or paper copies may be provided in quantities indicated in Division 1. Paper copies shall be organized including index tabs in a 3-ring black binder of sufficient size.
- D. Product Data Submittal including special boxes, cable, and other material as requested by the Engineer including:
 - 1. A cover sheet with the name and location of the project, the name, address, and telephone number of the Contractor, and the name, address, and telephone number of the submitting sub-contractor. Include on or after the cover sheet sufficient space for review stamps.
 - 2. An indication of any deviations from Contract Document requirements, including variations and limitations. Show any revisions to equipment layout required by use of selected equipment.
 - 3. A product data index and complete equipment list including for each product submitted for approval the manufacturer's name and part number, including options and selections.
 - 4. Cut-sheets or catalog data illustrating the physical appearance, size, function, compatibility, standards compliance, and other relevant characteristics of each product on the equipment list. Indicate by prominent notation (an arrow, circle, or other means) on each sheet the exact product and options being submitted.
 - 5. Submit design data, when the scope of work requires, including calculations, schematics, risers, sequences, or other data.
 - 6. Any resubmittal shall include a complete revised equipment list and any product data that is revised.
- E. Submit shop drawings locating all components and labeling of cable systems. Submit wiring diagrams of each system showing typical connections for all equipment, indicating circuit routing, cable type, and gauge. Shop or coordination drawings shall include information that will allow the Contractor to coordinate interdisciplinary work and when necessary guide the manufacturer or fabricator in producing the product. Shop or coordination drawings shall be specifically prepared to illustrate the submitted portion of work, this may require diagrams, schedules, details, and accurate to scale equipment and device layouts prepared using a CAD or BIM engineering drawing program.

1.5 QUALIFICATIONS OF A PROPOSED CONTRACTOR

- A. Proposed contractors who do not currently possess the necessary qualifications, trained and experienced personnel, financial capacity, and meet the other requirements herein described will be disqualified.
- B. The presentation system contractor shall be an established communications and electronics contractor that has had and currently maintains a locally run and operated business. The contractor shall be a duly authorized distributor for the equipment supplied, with full manufacturer's warranty privileges. The contractor shall stock spare parts and maintain a staff of trained technicians. The contractor shall have been actively engaged in the business of selling, installing, and servicing similar systems for a period of at least five (5) years under the same business name.
- C. The proposed contractor shall have an office staffed with trained technicians who are qualified and licensed to supervise the installation, to be responsible that the system is installed as submitted, to conduct system start up and perform a 100 percent operational audit of all installed devices, to instruct the Owners representatives in the proper operation of the system, and to provide service throughout the warranty period. The contractor shall be capable of dispatching technicians to repair a system within six hours of a service request. This office is to be located within a 300 mile radius of the site.
- D. The presentation system contractor shall be fully experienced in the design and installation of audio-video systems as herein specified, and shall have a minimum of five projects in a similar scope of work and at least 10 years' experience in the scoreboard industry.

VIDEO SCOREBOARD AND RELATED SYSTEMS

- E. The Contractor shall employ factory-trained technicians capable of supporting the maintenance of the system. No contract employees are allowed unless they have been to the factory service school within the last 18 months. A certificate of this training shall be provided with the contractors' submittal.
- F. The Proposed Contractor shall not have any grievances or complaints of record regarding workmanship, code compliance, or service response. A Proposed Contractor that has any prior finding(s) of a code violation or has any litigation in process concerning the installation of a communication system is unacceptable.
- G. The Owner may investigate, as they deem necessary to determine the ability of the proposed Contractor to perform the work. The proposed Contractor shall furnish to the Owner with any information or data requested for this purpose.
- H. The Owner reserves the right to reject any contract proposal if the evidence submitted, or their investigation, fails to indicate that the Contractor is qualified to fulfill of any part of the contract or to complete the work contemplated therein.
- I. The Owner reserves the right to reject the proposal of any Contractor who has previously failed to perform properly, or complete on time, contracts of a similar nature.

1.6 WARRANTY

- A. Manufacturer to provide 10 year, no dollar limit warranty on parts, material, labor and installation (including workmanship) on all audio-visual components, structural components and all accessories required for a full and complete system. On-site service shall be provided for the first 3 years of warranty coverage at no charge for warranty type repairs.
- B. Computer Equipment shall be warranted by the manufacturer for a period of three years, all software will include free updates for a period of two years.
- C. Direct on-site service is to be provided for a period of 3 years at no charge to the Owner for any warranty type of repairs. Direct on-site service, if necessary, is to be provided directly by scoreboard selling company during the remainder of the 10 year warranty period. All on-site warranty service call charges to be provided, if necessary, at a reasonable charge by the scoreboard selling company during the warranty period. All labor costs for warranty repairs to be covered under warranty as indicated above.

PART 2- PRODUCTS

2.1 GENERAL

- A. Approved Manufacturer's
 - 1. ACE Sports, a Division of ACE Signs Company; 11935 Interstate 30, Little Rock, AR, 72209; phone 800.224.1366
 - 2. Daktronics; 201 Daktronics Drive, Brookings, SD 57006-5128, phone 800.325.8766
 - 3. Watchfire Signs; 1015 Maple Street, Danville, IL 61832; phone 217.442.0611
 - 4. Scorevision, LLC; 11742 Stonegate Circle, Omaha, NE 68164; phone 402.253.0250
- B. The following sections specifically list the acceptable equipment types and items for this project. Where quantities are not noted, they may be obtained from the drawings. In the event of a discrepancy between the specifications and the drawings, the greater quantity or better quality shall be furnished.
- C. Furnish, deliver, erect, mount, connect and complete all the material and appliances described herein and in the drawings, and also all other incidental material and appliances, tools, transportation, etc., required to make the work complete, in accordance with the true intent of these plans and specifications, and as required to leave the system in first class operating condition.
- D. All date keeping hardware, firmware, and software provided shall be fully compliant with years designated in four-digit data format. Any time equations must function normally, leap year, and daylight savings time must be supported.

- E. Perform all assembly of equipment, wiring, and interconnection and soldering of wires to jacks, devices, terminals, or equipment, using technical employees only, who are experienced in the installation of sound equipment and its interconnection.

2.2 BASE LED VIDEO SCOREBOARD

- A. It is the responsibility of the Contractor to provide all features and functions as outlined in these specifications.
- B. The functions and features identified in this specification section are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

C. GENERAL INFORMATION

1. Bid:

- a. Contractor to provide all necessary equipment to meet the requirements of the Video Scoreboard. This includes, but is not limited to, LED Panels, Processing, Cabling, Structural Engineering, Structural Work, Electrical Work, and more.
- b. Approximate active area 24 Feet in Height and 44 Feet in Length. Installed with custom truss poles and header per drawing. Contractor is responsible to perform the work of the custom build with no exceptions. Includes 43" tall channel letter with 5' in Height and 44' in Width custom topper.
- c. The system shall be capable of being a digital scoreboard, live video playback, video replay, and more.
- d. Standard LED Digit Scoreboard to go underneath the Video Board. Approximate 8' in Height x 30' in Width (*per manufacturer dimensions). Must include play clock, score, down, yards to go, ball on, quarter, and time outs left. Includes white LED digits, scoring controller and (2) hand held remote controllers for game time and delay of game clocks.
- e. The Video Scoreboard shall be accompanied by (2) Advertisement Segments measuring 8' in Height and 6'-3" in Length, (1) Advertisement Segment underneath scoreboard measuring 40" in Height and 44' in Width. The static advertisement panes shall be provided by the contractor, based on advertisements sold by the district. Contractor shall work with the district to get the proper graphics required for printing.
- f. Contractor to provide 6' in Height and 8' in Width custom sound cabinet above video board. Includes mesh covering for speaker system.
- g. Contractor to coordinate all installation procedures with general contractor.
- h. The Video Scoreboard must interface with new standard scoreboard and new delay of game clocks. New Delay of Game Clocks are to be a minimum of 28" in Height and are to be installed on existing pole structures. Includes (2) new sponsor panes and cabinets approximate 4' in Height and 6' in Width. Cabinets are to be fabricated flush with delay of play clocks frame.
- i. Base Bid includes some new equipment in the Pressbox and some Owner Furnished Equipment.

2. Structural Requirements

- a. The contractor is responsible for providing proper signed and sealed prints approving the structure of the scoreboard and the added speaker cabinets. Design of structure is to include the reinforced concrete foundation, steel structure capable of handling gravity and lateral loading for the video boards and game clocks.
- b. The speaker cabinets must follow the design as presented in the bid documents but must be approved by the contractor's structural engineer.
- c. See Structural Drawings for Minimum Structural Requirements.

3. Electrical Requirements

- a. Install power to new score board and provide all necessary materials, trenching, backfilling and compaction for a complete job.
- b. Size electrical provisions in coordination with the Scoreboard manufacturer's detailed requirements. Install new panels and transformers as necessary.
- c. The contractor is responsible to provide raceways and fiber optic connection between the press box and the scoreboard.
- d. See electrical drawings and specifications for additional information.

VIDEO SCOREBOARD AND RELATED SYSTEMS

D. PIXEL CHARACTERISTICS

1. Each pixel shall consist of one (1) red, one (1) green and one (1) blue through-hole LED (DIP).
 - a. Pixels with an overbalance of a single LED color (e.g. two (2) red, one (1) green, one (1) blue) shall not be acceptable.
2. Pixel spacing measurement shall be measured from the center points of neighboring physical pixels, rather than neighboring physical and virtual pixels.
3. Must be a minimum of 360 full pixels per square feet.

E. LED MODULE/PANEL CHARACTERISTICS

1. Module shall be for outdoor use.
2. Module shall have anti-reflective paint or coating applied to display face. Black state across all modules shall exhibit a Delta E color variation of no more than .4.
3. Modules shall have horizontal louvers running between LEDs or pixels.
4. Modules shall be able to be removed and installed from both the front and rear of the display.
5. It shall not be necessary to remove or insert screws in order to remove or install a module.
6. Module shall be silicon potted on face beneath louver and rear, providing a 100% waterproof seal, regardless of module, cabinet, or panel construction.

F. LED CABINET/PANEL CHARACTERISTICS

1. 16mm Pitch
2. Paint borders of cabinet
3. Gradations Per Color: 16,384.
4. Color Capability: 16 bit (281 trillion colors).
5. Refresh Rate: 2,400 Hz as defined by the number of times per second the display image is repainted in intensity.
6. Display shall have signal redundancy allowing for signal path both forward and backwards through modules allowing for loss of only 1 module vs. rows or blocks of multiple modules in case of failure

G. VIDEO PROCESSING

1. Video Frame Rate: 50/60 frames per second.
2. Graphic Frame Rate: 30 frames per second.
3. Processing Architecture: 22-bit distributed
4. System Architecture: 100% digital
5. Video Enhancement: Color space conversion, adjustable gamma correction, proprietary sharpening technology and enhancement algorithms for optimal picture quality.
6. Standards Supported: NTSC and PAL
7. Acceptable Video Inputs: Analog composite or component or SDI

H. LED QUALITY

1. Quality Control: Sorted by intensity and color wavelength.
2. LED Lifetime: 100,000 hours of operation as defined by time at which display intensity has decreased to 50 percent of the original intensity.

I. DISPLAY CONSTRUCTION

1. Service Access: **Internal catwalk system see 2.2, U.**
2. Weatherproofing: Enclosed circuit board, sealed inputs and outputs, potted LEDs and a ventilation system designed for high humidity or heat. Component Ingress Protection Rating of 66. To achieve this standard, each module must be capable of operating properly while completely submerged in water.

J. VIEWING CHARACTERISTICS

1. Module Intensity: 10,000 nits Minimum (adjustable).
2. Brightness Control: 65,535+ levels (manual, scheduled or automatic).
3. Contrast Ratio: 1,200:1 Minimum
4. Suggested Horizontal Viewing Angle: 160° horizontally, as defined by the angle at which display intensity drops to 50 percent of direct frontal intensity.

5. Suggested Vertical Viewing Angle: 60°, vertically, as defined by the angle at which display intensity drops to 50 percent of direct frontal intensity.
- K. DISPLAY INTERFACE
1. Each of the full-color video displays MUST have the ability to interface and display realtime data from the control system without the need for a duplicate or redundant input.
- L. WIRELESS CONTROLLER
1. Each controller console to be furnished with one transmitter and one flexible antenna.
 2. Each scoreboard and timer to be furnished with one receiver and one flexible antenna.
 3. System allows for synchronized operation of two or more scoreboards from one controller.
 4. System utilizes Spread Spectrum Technology redundantly transmitting the same data at least 16 times per second.
 5. System must "hop" channels using 25 different frequencies at a rate of 10 per second.
 6. System refreshes the scoreboard with new data no less than 10 times per second for smooth and accurate operation of game clocks, including 1/10 second timing.
 7. System has a minimum transmission range of 1000 feet outdoors.
 8. System to be FCC certified.
 9. Transmitter and receiver are built into the controller and scoreboard and do not require additional mounting provisions or special placement.
- M. CALIBRATION
1. Pixel-to-pixel and module-to-module optical color calibration must be performed at the bidder's factory. The bidder shall also provide easy-to-use calibration software that allows individual modules and pixels to be independently adjusted while in the display. If modules should need replacement during the life of the display, the calibration software must match newer modules' brightness levels to older modules' levels in order to preserve picture quality and maintain a uniform display appearance.
- N. VIDEO PROCESSORS
1. Minimum Standard Hardware Features
 - a. Video Frame Rate 24/30/50/59.5/60 Frames Per Second
 - b. 5 Integrated Digital Media Players
 - c. Processing Architecture: 32-Bit (16-Bit Color Processing)
 - d. System Architecture: 100% Digital
 - e. Video Enhancement: Color Space Conversion, Adjustable Gamma Correction
 - f. Standard Supported Formats: NTSC, PAL, HDTV
 - g. Video Inputs: HD-SDI, HD-Component, SD-SDI, SD, Component
- O. DIGITAL MEDIA PLAYERS
1. Minimum Standard Hardware Features
 - a. Resolution: 1080p full motion
 - b. Hardware Features
 - 1) 8 GB DDR2 SDRAM (single channel)
 - 2) 3 TB solid state drive
 - 3) Dual Network Ports 10/100/1000 Ethernet (RJ-45 LAN)
 - 4) Audio output: 3-pin XLR balanced
 - 5) Ports: 6 USB 2.0, 4 USB 3.0
 - 6) Inputs: Component or Composite or SDI (HD-SDI)
 - 7) Outputs: DVI to Video Wall Processor
 - 8) Animation rates of up to 60 frames per second Processor
- P. VIDEO SCREEN CONTENT CONTROLLER HARDWARE
1. Minimum Hardware Features
 - a. 2.6 Ghz Intel Core I5 Dual-Core 4th Gen
 - b. Cache: L3:3MB
 - c. Memory: 8 GB

VIDEO SCOREBOARD AND RELATED SYSTEMS

- d. Graphics Intel Iris Graphics
- e. Hard Drive: 1 TB 5400 Minimum
- f. (2) Thunderbolt Ports
- g. (1) HDMI Port
- h. Mouse, Keyboard, and 24-Inch Monitor

Q. SCOREBOARD CONTROL CONSOLE INTERFACE

- 1. 1. D-Sub 9-Pin Input
- 2. 2. D-Sub 9-Pin Output
- 3. 3. BNC Connector
- 4. 4. ¼" TRS Connector
- 5. 5. Network Port
- 6. 6. Capable of talking to multiple scoreboards
- 7. 7. Must interface with the existing scoreboard controller

R. Loudspeakers

- 1. Two 12-inch low frequency drivers
- 2. Two 2-inch mid-range frequency drivers
- 3. One 1-inch high frequency driver
- 4. frequency range 71Hz to 19.5kHz
- 5. Coverage Pattern 50x20
- 6. power rating
 - a. Low 1200W @ 8 ohms
 - b. Mid 350W @ 8 ohms
 - c. High 350W @ 8 ohms
- 7. 3-Layer Weather-Stop
- 8. Acceptable Products
 - a. Community Pro R2-52MAX
 - b. Community Pro R6-51BIAMP
- 9. Required Accessories
 - a. Community Pro PMB-2RR
 - b. Adaptive YM-R6

S. Subwoofers

- 1. Six 12-inch long range low frequency drivers
- 2. Frequency Range 48Hz to 185Hz
- 3. Power Rating
 - a. 1200W @ 4 ohms
- 4. 3-Layer Weather Stop
- 5. Acceptable Product
 - a. Community Pro R6-BASSHORN

T. Amplifiers

- 1. Power Rating
 - a. 3200W @ 4 ohms
 - b. 2000W @ 8 ohms
 - c. DSP onboard
 - d. Networkable

U. Cabinet Enclosures Construction & Finishes

- 1. All enclosure panels to be all aluminum alloy with a 0.050" metal thickness on the front and sides.
- 2. Cabinet to be all aluminum and galvanized steel construction. All service to be from interior of cabinet. Provide as follows:
 - a. Display cabinet to be 4'-0" deep with internal access for service.

- b. Service technician can enter the interior of the cabinet to provide any service on the video display from within the interior space of the cabinet and will be protected from the weather.
 - c. Video cabinet to be fully enclosed and does not allow any water intrusion.
 - d. Provide rigid steel catwalks inside video cabinet for service technician to work from.
 - e. Interior working space shall be approximately 37" deep.
 - f. Provide ladder access from lowest cabinet (scoreboard or sign) up into bottom of video cabinet display at both ends of cabinet such that cabinet can be entered from either end for service.
 - g. Provide trap door access into video cabinet that allows these doors to be closed after technician has entered cabinet for safety against falling through door. After trap door has been closed, a technician can stand on this door and work from this area.
 - h. There shall be no access panels that need removal to service the components of the video display from within the interior space of this video.
 - i. Cabinet shall be fully sealed to prevent water intrusion.
 - j. Provide ventilation that pulls air in from bottom of display and extracts through exhaust fans mounted at each end of cabinet. Ventilation holes in bottom of cabinet to be 0.125" wide slots that prevent flying insect intrusion such as wasps and bees.
 - k. All electrical circuit panels for video display shall be located in this interior space.
 - l. Provide LED lighting for the interior space that is bright enough for technician to properly work on components. All areas of the interior of the video cabinet shall be lighted.
 - m. Rear side of video cabinet shall be solid black prefinished aluminum
3. Paint on scoreboard cabinet to be heavy duty, commercial grade, UV resistant paint, or approved equal, and to include a 10 year warranty against fading, peeling, and cracking. Colors to be selected by the Architect from the manufacturer's standards.

V. SPONSOR SIGNAGE

- 1. Provide sponsor signage in configurations shown on the drawings and as outlined below:
 - a. Include one contour-cut mascot that extends above arch of truss and include contour-cut lettering. Contour-cut mascot shall be 1" deep and fully enclosed with aluminum face, sides and back. Contour-cut lettering shall be 1" deep and fully enclosed with aluminum face, sides and back. Single thickness panels (sometimes attached to expanded metal screen) will not be accepted for this contour-cut mascot. Provide computer-cut adhesive sign vinyl with facility's mascots on the face of the contour-cut mascot panels, including all colors, as required. Must provide accurate approval drawing to Owner before delivery.
 - b. Applied Sponsor Signage: Provide computer-cut high performance adhesive sign vinyl with advertiser's logos, including all colors, as required. Must provide accurate approval drawing to Owner before delivery.
 - c. Rear-Lit Sponsor Signages: fully enclosed all aluminum cabinets, to be mounted securely as shown on drawings and to right side of each delay-of-game timer. Provide internal LED lighting with electronic ballasts. Sign face shall be translucent "flexible-cloth" with translucent vinyl graphics. Provide computer-cut adhesive translucent sign vinyl with advertiser's logos (non-digital artwork), including all colors, as required. Must provide accurate approval drawing to Owner before delivery.

2.3 GAME CLOCKS

- A. Provide two LED delay-of-game timers, 6'-0" wide by 3'-0" high, displaying TIME REMAINING in seconds for periods up to 99 seconds or less. Provide all necessary vinyl captions and vinyl trim for above. Cabinet color to be Black.
 - 1. Provide White LED's on all digits.
 - 2. Paint back of timers Black.
 - 3. Provide wireless handswitch with TIMER on/off and RESET1 and RESET2 switches for remote operation of timers. Each reset is programmable for any reset time from 0-99 seconds. Handswitch communicates by wireless signal to controller console listed above.

VIDEO SCOREBOARD AND RELATED SYSTEMS

PART 3- EXECUTION

3.1 INSTALLATION

- A. Manufacturer is to inspect the site of the installation prior to beginning fabrication of scoreboard, steel, etc. Notify the Contractor and Architect of any issues affecting ability to install as specified herein or in accordance with manufacturer's instructions.
- B. Protect all components at the job site, keep dry and ventilated, and in accordance with the manufacturer's instructions until install can commence.
- C. Install structural components as detailed by the manufacturer's engineer as outlined above.
- D. Install all video control equipment and video transmission system in strict accordance with the manufacturer's instructions to provide a fully functioning system.
- E. Provide and install fiber wire in Owner's conduit for operation of video display. Provide and terminate fiber ends for properly operating video display.
- F. Install timers on existing timer structures.
- G. Remove existing scoreboard and structure. Existing columns are to be cut off at ground level; existing concrete footings are to be left in place. Owner shall be responsible for discarding existing scoreboard and structure.
- H. Installation to be performed by qualified personnel from the scoreboard selling company.
- I. Paragraph deleted.

3.2 SERVICE

- A. Provide a minimum of one day on-site training for scoreboard operation, video display and electronic advertising displays, service and maintenance procedures.
- B. Provide the following:
 - 1. Sports marketing plan to generate revenue both locally & nationally
 - 2. Ongoing media consultation and support
 - 3. Game script collaboration for overall production during games
 - 4. Classroom training for media team
 - 5. Continuing support to create custom content tailored toward your needs, any-time remote access for troubleshooting the video board or software, 24/7 emergency phone number for urgent needs, etc.
- C. Provide such service for first year of operation.
- D. Provide service agreement/proposal for ongoing service thereafter.

END OF SECTION

