



# Seneca Amphitheater

300 MAIN STREET  
SENECA, SOUTH CAROLINA 29678

OWNER: CITY OF SENECA, SC

Issue for BID  
02.07.2025



mcs project no 023193.02

# PROJECT MANUAL

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**DOCUMENT 00 01 01 - PROJECT TITLE PAGE**

- 1.1 PROJECT MANUAL: Issue for Permit
- A. Seneca Amphitheater.
  - B. City of Seneca,
  - C. Seneca, South Carolina.
  - D. Architect Project No. 023193.02.
  - E. McMillan Pazdan Smith Architecture.
  - F. 400 Augusta Street.
  - G. Greenville, SC 29601.
  - H. Issued for Permit: 10.25.2024

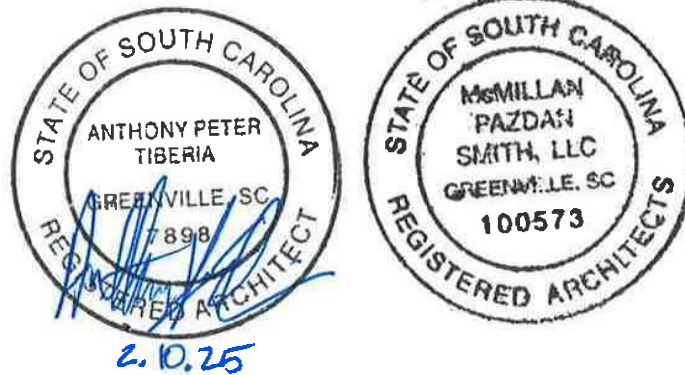
**END OF DOCUMENT**

**DOCUMENT 00 01 07 – ARCHITECTURAL SEAL PAGE**

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. Anthony Tiberia, aia, ncarb, principal
2. 7898
3. Responsible for Divisions 01-32 Sections except where indicated as prepared by other design professionals of record.



**END OF DOCUMENT**

## DOCUMENT 00 11 13 - ADVERTISEMENT FOR BIDS

### 1.1 PROJECT INFORMATION

- A. The City of Seneca is requesting proposals for the construction of an Amphitheater stage and canopy structure, along with related site work and electrical infrastructure.
- B. Notice to Bidders: Qualified bidders may submit bids for project as described in this Document. Submit bids according to the Instructions to Bidders.
- C. Project Identification: Seneca Amphitheater.
  - 1. Project Location: 300 Main Street, Seneca, South Carolina 29678
- D. Owner: City of Seneca, South Carolina.
  - 1. Owner's Representative: Mr. Scott Moulder, Seneca City Administrator
    - a. P.O. Box 4773; Seneca, SC 29679.
    - b. Telephone: (864) 885.2721
    - c. Email: smoulder@seneca.sc.us
- E. Architect: McMillan Pazdan Smith Architecture
  - 1. Project Architect: Mr. Anthony Tiberia, AIA, NCARB, Principal.
  - 2. 400 Augusta Street, Greenville, SC 29601
  - 3. Telephone: (864) 679.6223
  - 4. Email: atiberia@mcmillanpazdansmith.com
- F. Project Description: Project consists of Amphitheater site and covered Stage as indicated in Construction Documents.
  - 1. Project cost range is anticipated to be under \$1,612,000.00.
- G. Construction Contract: Bids will be received for the following Work:
  - 1. General Contract (all trades).
- H. Digital Procurement and Contracting Documents: Obtain after February 14, 2025 available for download on the City of Seneca web-site.

### 1.2 PRE-BID CONFERENCE

- A. The Owner will hold a non-mandatory pre-bid conference, prospective prime bidders are requested to attend.
  - 1. Date: 02.24.2025
  - 2. Location: Project Site: 300 Main Street Seneca, SC 29678
  - 3. Time: 10:30 a.m. EST
- B. Bidders' Questions: Architect will provide responses at Prebid conference to bidders' questions received up to two business days prior to conference.

### 1.3 BID SUBMITTAL AND OPENING

- A. Owner will receive sealed bids until the bid time and date at the location given below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:
1. Bid Due Date: 03.17.2025.
  2. Bid Time: 2:00 p.m. EST.
  3. Bid Delivery Locations:
    - a. 221 E. North 1<sup>st</sup> Street, Seneca, SC 29678.
    - b. PO Box 4773, Seneca, SC 29679

### 1.4 BID SECURITY

- A. Bid security shall be submitted with each bid in the amount of 5 percent of the bid amount. No bids may be withdrawn for a period of 90 days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

### 1.5 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. Successful bidder shall begin the Work on receipt of the Notice to Proceed and shall complete the Work within the Contract Time. Refer to Bid form specified in Section 00 41 13 "Bid Form – "Stipulated Sum (Single Prime Contract)".
1. Notice to Proceed Date: 04.09.2025
  2. Completion Date: 10.01.2025
- B. Work is subject to liquidated damages. Refer to the Acknowledgements article in specification section 00 41 13 "Bid Form – "Stipulated Sum (Single Prime Contract)" for terms and amounts.

### 1.6 BIDDER'S QUALIFICATIONS

- A. Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required of the successful Bidder.

### 1.7 NOTIFICATIONS

- A. This Advertisement for Bids document is issued by The City of Seneca, South Carolina.
- B. This project is being funded in whole or in part by the Appalachian Regional Commission (ARC). All federal ARC requirements will apply to the contract. All contractors and subcontractors are required to be registered in the federal System for Award Management (SAM). Bidders on this Work will be required to comply with the President's Executive Order No. 11246 & Order No. 11375 which prohibits discrimination in employment regarding race, creed, color, sex or national origin.

Bidders must comply with Title VI of the Civil Rights Act of 1964, the Davis-Bacon Act, the Anti-Kickback Act, the Contract Work Hours and Safety Standards Act, and 40 CFR 33.240 and Build America, Buy America Act (BAP), imposed by the Build America, Buy America Act (BABA), enacted under Division G, Title IX of the Infrastructure Investment and Jobs Act (IIJA, Pub. L. No. 117-58) signed into law on November 15, 2021. The ARC application, including the cost estimate, is available for review by contacting Arlene Young at [ayoung@scacog.org](mailto:ayoung@scacog.org).

1. Bidders must also make positive efforts to use disadvantaged businesses, small business, and minority-owned business enterprises. Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract.
  2. The owner reserves the right to waive any irregularities, or to reject any or all bids.
- C. No bidder may withdraw a bid within 90 days following bid opening.
- D. Contract is subject to the requirements of regulations implementing Executive Orders 12549 and 12689, Debarment and Suspension, ineligibility and voluntary exclusion lower tier covered transactions and 2 CFR Part 200. Contractor must complete the Certification Form bound in this project Manual.
- E. Contract is subject to the requirements of the South Carolina Illegal Immigration Reform Act. Contractor must certify that it is in compliance with the requirements of Title 8, Chapter 14 of the S.C. Code Annotated and will remain in compliance with such requirements throughout the term of it's contract with the City of Seneca. Contractor must complete the Certification Form bound in this project Manual.
- F. Contract is subject to the Davis-Bacon Act and is required to pay the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Davis-Bacon Wage Determination document is bound in this Project Manual.
- G. Contract is subject to compliance with Mitigation Measures and Conditions. Refer to the Mitigation Measures and Conditions [40 CFR 1505.2(c)] bound in this Project Manual.
- H. The Contract is an "Equal Employment Opportunity" project.

**END OF DOCUMENT**



## **DOCUMENT 00 21 13 - INSTRUCTIONS TO BIDDERS**

### 1.1 INSTRUCTIONS TO BIDDERS

- A. AIA Document A701, "Instructions to Bidders," is hereby incorporated into the Procurement and Contracting Requirements by reference.
  - 1. A copy of AIA Document A701, "Instructions to Bidders," is bound in this Project Manual.

**END OF DOCUMENT**

## DOCUMENT 00 22 13 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

### 1.1 INSTRUCTIONS TO BIDDERS

A. Instructions to Bidders for Project consist of the following:

1. AIA Document A701, "Instructions to Bidders.", a copy of which is bound in this Project Manual.
2. The following Supplementary Instructions to Bidders that modify and add to the requirements of the Instructions to Bidders.

### 1.2 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, GENERAL

- A. The following supplements modify AIA Document A701, "Instructions to Bidders." Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Instructions to Bidders, unaltered portions of the Instructions to Bidders shall remain in effect.

### 1.3 ARTICLE 2 - BIDDER'S REPRESENTATIONS

A. Add Section 2.1.3.1:

1. 2.1.3.1 - The Bidder has investigated all required fees, permits, and regulatory requirements of authorities having jurisdiction and has properly included in the submitted bid the cost of such fees, permits, and requirements not otherwise indicated as provided by Owner.

B. Add Section 2.1.5:

1. 2.1.5 - The Bidder is a properly licensed Contractor according to the laws and regulations of Seneca, South Carolina and meets qualifications indicated in the Procurement and Contracting Documents.

C. Add Section 2.1.6:

1. 2.1.6 - The Bidder has incorporated into the Bid adequate sums for work performed by installers whose qualifications meet those indicated in the Procurement and Contracting Documents.

### 1.4 ARTICLE 3 - BIDDING DOCUMENTS

A. 3.2 - Interpretation or Correction of Procurement and Contracting Documents:

1. Add Section 3.2.2.1:
  - a. 3.2.2.1 - Submit Bidder's Requests for Interpretation using AIA form G716.

B. 3.4 - Addenda:

1. Delete Section 3.4.3 and replace with the following:
  - a. 3.4.3 - Addenda may be issued at any time prior to the receipt of bids.
2. Add Section 3.4.4.1:

- a. 3.4.4.1 - Owner may elect to waive the requirement for acknowledging receipt of 3.4.4 Addenda as follows:
  - 1) 3.4.4.1.1 - Information received as part of the Bid indicates that the Bid, as submitted, reflects modifications to the Procurement and Contracting Documents included in an unacknowledged Addendum.
  - 2) 3.4.4.1.2 - Modifications to the Procurement and Contracting Documents in an unacknowledged Addendum do not, in the opinion of Owner, affect the Contract Sum or Contract Time.

## 1.5 ARTICLE 4 - BIDDING PROCEDURES

### A. 4.1 - Preparation of Bids:

1. Add Section 4.1.1.1:
  - a. 4.1.1.1 - Printable electronic Bid Forms and related documents are available from Architect.
2. Add Section 4.1.8:
  - a. 4.1.8 - The Bid shall include unit prices when called for by the Procurement and Contracting Documents. Owner may elect to consider unit prices in the determination of award. Unit prices will be incorporated into the Contract.
3. Add Section 4.1.9:
  - a. 4.1.9 - Owner may elect to disqualify a bid due to failure to submit a bid in the form requested, failure to bid requested alternates or unit prices, failure to complete entries in all blanks in the Bid Form, or inclusion by the Bidder of any alternates, conditions, limitations or provisions not called for.
4. Add Section 4.1.10:
  - a. 4.1.10 - Bids shall include sales and use taxes. Contractors shall show separately with each monthly payment application the sales and use taxes paid by them and their subcontractors in the form indicated. Reimbursement of sales and use taxes, if any, shall be applied for by Owner for the sole benefit of Owner.

### B. 4.3 - Submission of Bids:

1. Add Section 4.3.1.2:
  - a. 4.3.1.2 - Include Bidder's Contractor License Number applicable in Project jurisdiction on the face of the sealed bid envelope.

### C. 4.4 - Modification or Withdrawal of Bids:

1. Add the following sections to 4.4.2:
  - a. 4.4.2.1 - Such modifications to or withdrawal of a bid may only be made by persons authorized to act on behalf of the Bidder. Authorized persons are those so identified in the Bidder's corporate bylaws, specifically empowered by the Bidder's charter or similar legally binding document acceptable to Owner, or by a power of attorney, signed and dated, describing the scope and limitations of the power of attorney. Make such documentation available to Owner at the time of seeking modifications or withdrawal of the Bid.
  - b. 4.4.2.2 - Owner will consider modifications to a bid written on the sealed bid envelope by authorized persons when such modifications comply with

the following: the modification is indicated by a percent or stated amount to be added to or deducted from the Bid; the amount of the Bid itself is not made known by the modification; a signature of the authorized person, along with the time and date of the modification, accompanies the modification. Completion of an unsealed bid form, awaiting final figures from the Bidder, does not require power of attorney due to the evidenced authorization of the Bidder implied by the circumstance of the completion and delivery of the Bid.

D. 4.6 - Subcontractors, Suppliers, and Manufacturers List Bid Supplement:

1. Add Section 4.6:
  - a. 4.6 - Provide list of major subcontractors, suppliers and manufacturers furnishing or installing products no later than two business days following Architect's request. Include those subcontractors, suppliers, and manufacturers providing work totaling three percent or more of the Bid amount. Do not change subcontractors, suppliers, and manufacturers from those submitted without approval of Architect.

1.6 ARTICLE 5 - CONSIDERATION OF BIDS

A. 5.2 - Rejection of Bids:

1. Add Section 5.2.1:
  - a. 5.2.1 - Owner reserves the right to reject a bid based on Owner's and Architect's evaluation of qualification information submitted following opening of bids. Owner's evaluation of the Bidder's qualifications will include: status of licensure and record of compliance with licensing requirements, record of quality of completed work, record of Project completion and ability to complete, record of financial management including financial resources available to complete Project and record of timely payment of obligations, record of Project site management including compliance with requirements of authorities having jurisdiction, record of and number of current claims and disputes and the status of their resolution, and qualifications of the Bidder's proposed Project staff and proposed subcontractors.

1.7 ARTICLE 6 - POSTBID INFORMATION

A. 6.1 - Contractor's Qualification Statement:

1. Add Section 6.1.1:
  - a. 6.1.1 - Submit Contractor's Qualification Statement no later than two business days following Architect's request.

B. 6.3 - Submittals:

1. Add Section 6.3.1.4:
  - a. 6.3.1.4 - Submit information requested in Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 no later than two business days following Architect's request.

1.8 ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

A. 7.1 - Bond Requirements:

1. Add Section 7.1.1.1:
  - a. 7.1.1.1 - Both a Performance Bond and a Payment Bond will be required, each in an amount equal to 100 percent of the Contract Sum.

B. 7.2 - Time of Delivery and Form of Bonds:

1. Delete the first sentence of Section 7.2.1 and insert the following:
  - a. The Bidder shall deliver the required bonds to Owner no later than 10 days after the date of Notice of Intent to Award and no later than the date of execution of the Contract, whichever occurs first. Owner may deem the failure of the Bidder to deliver required bonds within the period of time allowed a default.
2. Delete Section 7.2.3 and insert the following:
  - a. 7.2.3 - Bonds shall be executed and be in force on the date of the execution of the Contract.

1.9 ARTICLE 9 - EXECUTION OF THE CONTRACT

A. Add Article 9:

1. 9.1.1 - Subsequent to the Notice of Intent to Award, and within 10 days after the prescribed Form of Agreement is presented to the Awardee for signature, the Awardee shall execute and deliver the Agreement to Owner through Architect, in such number of counterparts as Owner may require.
2. 9.1.2 - Owner may deem as a default the failure of the Awardee to execute the Contract and to supply the required bonds when the Agreement is presented for signature within the period of time allowed.
3. 9.1.3 - Unless otherwise indicated in the Procurement and Contracting Documents or the executed Agreement, the date of commencement of the Work shall be the date of the executed Agreement or the date that the Bidder is obligated to deliver the executed Agreement and required bonds to Owner.
4. 9.1.4 - In the event of a default, Owner may declare the amount of the Bid security forfeited and elect to either award the Contract to the next responsible bidder or re-advertise for bids.

**END OF DOCUMENT**

## **DOCUMENT 00 31 43 - PERMIT APPLICATION**

### **1.1 PERMIT APPLICATION INFORMATION**

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. This Document and its attachments are not part of the Contract Documents.
- B. Permit Application: Complete building permit application and file with authorities having jurisdiction within five days of the date of execution of the Contract.

**END OF DOCUMENT**

**DOCUMENT 00 41 13 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)**

1.1 BID INFORMATION

- A. Bidder: \_\_\_\_\_.
- B. Project Name: Seneca Amphitheater.
- C. Project Location: 300 Main Street, Seneca, South Carolina 29678.
- D. Owner: City of Seneca, South Carolina.
- E. Architect: McMillan Pazdan Smith Architecture.
- F. Architect Project Number: 023193.02.

1.2 CERTIFICATIONS AND BASE BID

- A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by McMillan Pazdan Smith and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

1.3 BID GUARANTEE

- A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 calendar days after a written Notice of Award, if offered within 90 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:

1. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

- B. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.4 TIME OF COMPLETION

- A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect and shall fully complete the Work within 180 calendar days.

1.5 CERTIFICATIONS

- A. The undersigned Bidder acknowledges receipt of and has submitted along with the Bid a completed and signed the Debarment Certification Form bound in this Project Manual.
- B. The undersigned Bidder acknowledges receipt of and has submitted along with the Bid a completed and signed the Contractor Illegal Immigration Certification Form bound in this Project Manual.

1.6 ACKNOWLEDGEMENTS

- A. The undersigned Bidder acknowledges and verifies compliance with “Instructions To Bidders” AIA Document A701-2018, bound in this Project Manual.

1. Signed By: \_\_\_\_\_ (Type or print name).

- B. The undersigned Bidder acknowledges and verifies compliance with Appalachian Regional Commission Contract Special Provisions document, bound in this Project Manual.

1. Signed By: \_\_\_\_\_ (Type or print name).

- C. The undersigned Bidder acknowledges compliance with the Davis-Bacon Act Wage Determination documents. Building and Highway Construction Type wage requirements are bound in this Project Manual.

1. Signed By: \_\_\_\_\_ (Type or print name).

- D. The undersigned Bidder acknowledges certification and compliance with the “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transactions” document bound in this Project Manual.

1. Signed By: \_\_\_\_\_ (Type or print name).

- E. The undersigned Bidder acknowledges and certifies compliance with the “South Carolina Illegal Immigration Reform Act” bound in this Project Manual.

1. Signed By: \_\_\_\_\_ (Type or print name).



- F. The undersigned Bidder acknowledges compliance and certification documentation with the "Build America, By America Act (BABAA)" certification information is complete and accurate; BABBA bid form and compliance certification bound in this Project Manual.

1. Signed By: \_\_\_\_\_ (Type or print name).

- G. The undersigned bidder acknowledges Contractor shall pay Owner liquidated damages in the amount of \$500.00 per day beyond the approved and agreed upon construction completion date of 10.01.2025. Refer to Sample Agreement between Owner and Contractor for Construction Contract included in this project manual.

1. Signed By: \_\_\_\_\_ (Type or print name).

#### 1.7 CONTRACTOR'S LICENSE

- A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in Seneca, South Carolina and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

#### 1.8 BID FORM SUPPLEMENT

- A. A completed Proposed Schedule of Values form is required to be attached to the Bid Form.

#### 1.9 PROPOSED SCHEDULE OF VALUES FORM

- A. Proposed Schedule of Values Form: Provide a breakdown of the bid amount, including alternates, in enough detail to facilitate continued evaluation of bid.
- B. Arrange schedule of values in format specified in Article 1.10 below, and per AIA Document G703-1992.
1. Copies of AIA standard forms may be obtained from the American Institute of Architects; <https://www.aiacontracts.org/library>; (800) 942-7732.

#### 1.10 SCHEDULE OF VALUES

- A. Schedule of Values Bid Form: Provide a breakdown of the bid amount, in enough detail to facilitate continued evaluation of bid. Provide multiple line items for principal material and subcontract amounts as follows:

1. General Conditions:

a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

2. Civil:

a. Grading Mobilization/Strip/Grade

1) \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

- b. Erosion control
  - 1) \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- c. Fine Grading
  - 1) \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- d. Utilities
  - 1) \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- 3. Landscaping:
  - a. Plantings/Trees
    - 1) \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
  - b. Sod
    - 1) \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
  - c. Synthetic Turf
    - 1) \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
  - d. Irrigation
    - 1) \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- 4. Structural Timbers/Wood Decking:
  - a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- 5. Structural Steel:
  - a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- 6. Concrete:
  - a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- 7. Natural Stone Veneer:
  - a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).
- 8. Roofing:
  - a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

9. Miscellaneous Metals (gates and railings):

a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

10. Exterior Paint and Stain Finishing:

a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

11. Electrical:

a. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

1.11 SUBMISSION OF BID

A. Respectfully submitted this \_\_\_\_ day of \_\_\_\_\_, 2025.

B. Submitted By: \_\_\_\_\_ (Name of bidding firm or corporation).

C. Authorized Signature: \_\_\_\_\_ (Handwritten signature).

D. Signed By: \_\_\_\_\_ (Type or print name).

E. Title: \_\_\_\_\_ (Owner/Partner/President/Vice President).

F. Witnessed By: \_\_\_\_\_ (Handwritten signature).

G. Attest: \_\_\_\_\_ (Handwritten signature).

H. By: \_\_\_\_\_ (Type or print name).

I. Title: \_\_\_\_\_ (Corporate Secretary or Assistant Secretary).

J. Street Address: \_\_\_\_\_.

K. City, State, Zip: \_\_\_\_\_.

L. Phone: \_\_\_\_\_.

M. License No.: \_\_\_\_\_.

N. Federal ID No.: \_\_\_\_\_ (Affix Corporate Seal Here).

**END OF DOCUMENT**

## DOCUMENT 00 43 13 - BID SECURITY FORMS

### 1.1 BID FORM SUPPLEMENT

- A. A completed bid bond form is required to be attached to the Bid Form.

### 1.2 BID BOND FORM

- A. AIA Document A312-2010 "Bid Bond" is the recommended form for a bid bond. A bid bond acceptable to Owner, or other bid security as described in the Instructions to Bidders, is required to be attached to the Bid Form as a supplement.
- B. Copies of AIA standard forms may be obtained from The American Institute of Architects; <https://www.aiacontracts.org/>; email: [docspurchases@aia.org](mailto:docspurchases@aia.org); (800) 942-7732.

**END OF DOCUMENT**

## SECTION 01 25 00 - SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

#### 1.1 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.2 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use form that is part of web-based Project management software acceptable to Architect.
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
    - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. Certificates and qualification data, where applicable or requested.
    - g. Cost information, including a proposal of change, if any, in the Contract Sum.
    - h. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.

- i. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within five working days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within five working days of receipt of request, or five working days of receipt of additional information or documentation, whichever is later.
  - a. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

### 1.3 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

### 1.4 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

### 1.5 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen calendar days prior to time required for preparation and review of related submittals.
  1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Substitution request is fully documented and submitted in accordance with specified requirements.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible and fully coordinated with other portions of the Work.
    - f. Requested substitution provides specified warranty.
- B. Substitutions for Convenience: Not allowed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION**



## SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. RFIs.
  - 4. Digital project management procedures.
  - 5. Web-based Project management software package.
  - 6. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
  - 1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

#### 1.2 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 calendar days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and

responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, in web-based Project software directory and in prominent location in built facility. Keep the list current at all times.

#### 1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
  1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
  2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  1. Preparation of Contractor's construction schedule.
  2. Preparation of the schedule of values.
  3. Installation and removal of temporary facilities and controls.
  4. Delivery and processing of submittals.
  5. Progress meetings.
  6. Preinstallation conferences.
  7. Project closeout activities.
  8. Startup and adjustment of systems.

#### 1.5 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.

2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
  2. Owner name.
  3. Owner's Project number.
  4. Name of Architect.
  5. Architect's Project number.
  6. Date.
  7. Name of Contractor.
  8. RFI number, numbered sequentially.
    - a. Provide an alphanumeric suffix for initial RFIs requiring additional information and or further clarification.
  9. RFI subject.
  10. Specification Section number and title and related paragraphs.
  11. Drawing number and detail references.
  12. Field dimensions and conditions, as appropriate.
  13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  14. Contractor's signature.
  15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or a Software-generated form with substantially the same content as indicated above, acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals, substitutions and contractor means and methods.
    - b. Requests for coordination information already indicated in the Contract Documents, adjustments in the Contract Time or the Contract Sum, and
    - c. Requests for interpretation of Architect's actions on submittals.
    - d. Incomplete RFIs or RFI's not prepared in accordance with this specification section.
    - e. RFI's that do not include potential cost or schedule impact.
    - f. RFI's that do not include Contractor suggested resolution.
    - g. RFI's that do not include related Construction document plan, elevation or section drawing, Construction Document detail, schedule or specification section and paragraph.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal in accordance with the Agreement between Owner and Builder contract.
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 calendar days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of web-based Project management software. Include the following:
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number, including RFIs that were returned without action or withdrawn.
    - a. Subsequent or follow up RFI's.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date RFI is due for return to Contractor.
  8. Date Architect's response was received.
  9. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three working days if Contractor disagrees with response.

## 1.6 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project Record Drawings.
  2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
  3. Digital Drawing Software Program: Contract Drawings are available in Revit 2019.
  4. Contractor shall execute a data licensing agreement in the form provided by Architect.
  5. The following digital data files will be furnished for each appropriate discipline:
    - a. Floor plans.
    - b. Reflected ceiling plans.
- B. Web-Based Project Management Software Package: Provide, administer, and use web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.
1. Web-based Project management software includes, at a minimum, the following features:

- a. Compilation of Project data, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
  - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
  - c. Document workflow planning, allowing customization of workflow between project entities.
  - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
  - e. Track status of each Project communication in real time, and log time and date when responses are provided.
  - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
  - g. Processing and tracking of payment applications.
  - h. Processing and tracking of contract modifications.
  - i. Creating and distributing meeting minutes.
  - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
  - k. Management of construction progress photographs.
  - l. Mobile device compatibility, including smartphones and tablets.
2. Provide up to seven Project management software user licenses for use of Owner, Architect, and Architect's consultants. Provide eight hours of software training at Architect's office for web-based Project software users.
  3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.
  3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

## 1.7 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of seven working days prior to meeting.

2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees no less than three working days prior to meeting.
  3. Minutes: Record discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three working days following the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 working days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Responsibilities and personnel assignments.
    - b. Tentative construction schedule.
    - c. Critical work sequencing and long lead items.
    - d. Designation of key personnel and their duties.
    - e. Lines of communications.
    - f. Use of web-based Project software.
    - g. Procedures for processing field decisions and Change Orders.
    - h. Procedures for RFIs.
    - i. Procedures for testing and inspecting.
    - j. Procedures for processing Applications for Payment.
    - k. Distribution of the Contract Documents.
    - l. Submittal procedures.
    - m. Preparation of Record Documents.
    - n. Use of the premises.
    - o. Work restrictions.
    - p. Working hours.
    - q. Responsibility for temporary facilities and controls.
    - r. Procedures for moisture and mold control.
    - s. Procedures for disruptions and shutdowns.
    - t. Construction waste management and recycling.
    - u. Parking availability.
    - v. Office, work, and storage areas.
    - w. Equipment deliveries and priorities.
    - x. First aid.
    - y. Security.
    - z. Progress cleaning.
  3. Minutes: Contractor will record and distribute meeting minutes within three working days following the meeting.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity where required by other Sections and where required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with

- other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Sustainable design requirements.
    - i. Review of mockups.
    - j. Possible conflicts.
    - k. Compatibility requirements.
    - l. Time schedules.
    - m. Weather limitations.
    - n. Manufacturer's written instructions.
    - o. Warranty requirements.
    - p. Compatibility of materials.
    - q. Acceptability of substrates.
    - r. Temporary facilities and controls.
    - s. Space and access limitations.
    - t. Regulations of authorities having jurisdiction.
    - u. Testing and inspecting requirements.
    - v. Installation procedures.
    - w. Coordination with other work.
    - x. Required performance results.
    - y. Protection of adjacent work.
    - z. Protection of construction and personnel.
  3. Record conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information within three working days following conference.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 calendar days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of Record Documents.

- b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
  - c. Procedures for completing and archiving web-based Project software site data files.
  - d. Submittal of written warranties.
  - e. Requirements for preparing operations and maintenance data.
  - f. Requirements for delivery of material samples, attic stock, and spare parts.
  - g. Requirements for demonstration and training.
  - h. Preparation of Contractor's punch list.
  - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
  - j. Submittal procedures.
  - k. Coordination of separate contracts.
  - l. Owner's partial occupancy requirements.
  - m. Installation of Owner's furniture, fixtures, and equipment.
  - n. Responsibility for removing temporary facilities and controls.
4. Minutes: Contractor will record and distribute meeting minutes within three working days following conference.
- E. Progress Meetings: Conduct progress meetings at biweekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication and product lead times.
      - 6) Access.
      - 7) Site use.
      - 8) Temporary facilities and controls.
      - 9) Progress cleaning.
      - 10) Quality and work standards.
      - 11) Status of correction of deficient items.



- 12) Field observations.
  - 13) Status of RFIs.
  - 14) Status of Proposal Requests.
  - 15) Pending changes.
  - 16) Status of Change Orders.
  - 17) Pending claims and disputes.
  - 18) Documentation of information for payment requests.
4. Minutes: Contractor will record and distribute the meeting minutes to each party present and to parties requiring information within three working days following Progress meeting.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION**

## SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
1. Startup construction schedule.
  2. Contractor's Construction Schedule.
  3. Construction schedule updating reports.
  4. Daily construction reports.
  5. Material location reports.
  6. Site condition reports.
  7. Unusual event reports.

#### 1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  2. Predecessor Activity: An activity that precedes another activity in the network.
  3. Successor Activity: An activity that follows another activity in the network.
- B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- C. Event: The starting or ending point of an activity.
- D. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- E. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file.
  - 2. PDF file.
- B. Startup construction schedule.
  - 1. Submittal of cost-loaded startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Daily Construction Reports: Submit at weekly intervals.
- F. Material Location Reports: Submit at weekly intervals.
- G. Site Condition Reports: Submit at time of discovery of differing conditions.
- H. Unusual Event Reports: Submit at time of unusual event.
- I. Qualification Data: For scheduling consultant.

### 1.4 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints, including work stages and interim milestones.
  - 4. Review delivery dates for Owner-furnished products.
  - 5. Review schedule for work of Owner's separate contracts.
  - 6. Review submittal requirements and procedures.
  - 7. Review time required for review of submittals and resubmittals.
  - 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 9. Review time required for Project closeout and Owner startup procedures.
  - 10. Review and finalize list of construction activities to be included in schedule.
  - 11. Review procedures for updating schedule.

## 1.5 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.
  - 2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

## 1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
- B. Time Frame: Extend schedule from date established for the Notice of Award to date of Final Completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 20 calendar days, unless specifically allowed by Architect.
  - 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
    - a. Securing of approvals and permits required for performance of the Work.
    - b. Temporary facilities.
    - c. Construction of mock-ups, prototypes and samples.
    - d. Owner interfaces and furnishing of items.
    - e. Interfaces with Separate Contracts.
    - f. Regulatory agency approvals.
    - g. Punch list.
  - 3. Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 60 calendar days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 4. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
  - 5. Startup and Testing Time: Include no fewer than 15 calendar days for startup and testing.
  - 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
  - 7. Punch List and Final Completion: Include not more than 30 calendar days for completion of punch list items and Final Completion.

- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  2. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Use-of-premises restrictions.
    - b. Provisions for future construction.
    - c. Seasonal variations.
    - d. Environmental control.
  3. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Mockups.
    - e. Fabrication.
    - f. Sample reviewing.
    - g. Deliveries.
    - h. Installation.
    - i. Tests and inspections.
    - j. Adjusting.
    - k. Curing.
    - l. Startup and placement into final use and operation.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
  2. Unanswered Requests for Information.
  3. Rejected or unreturned submittals.
  4. Notations on returned submittals.
  5. Pending modifications affecting the Work and the Contract Time.
- F. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one calendar week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate Final Completion percentage for each activity.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.

Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

- H. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

## 1.7 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 calendar days of date established for the Notice to Proceed.
  - 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 calendar percent increments within time bar.

## 1.8 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. List of separate contractors at Project site.
  - 3. Approximate count of personnel at Project site.
  - 4. Equipment at Project site.
  - 5. Material deliveries.
  - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
  - 7. Testing and inspection.
  - 8. Accidents.
  - 9. Meetings and significant decisions.
  - 10. Unusual events.
  - 11. Stoppages, delays, shortages, and losses.
  - 12. Meter readings and similar recordings.
  - 13. Emergency procedures.
  - 14. Orders and requests of authorities having jurisdiction.
  - 15. Change Orders received and implemented.
  - 16. Construction Change Directives received and implemented.

17. Services connected and disconnected.
  18. Equipment or system tests and startups.
  19. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- C. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
1. Submit unusual event reports directly to Owner within one calendar day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION**

## SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Concealed Work photographs.
  - 3. Periodic construction photographs.
  - 4. Final Completion construction photographs.
  - 5. Periodic construction video recordings.
- B. Related Requirements:
  - 1. Section 01 77 00 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.

#### 1.2 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three working days of taking photographs.
  - 1. Submit photos by uploading to web-based Project management software site. Include copy of key plan indicating each photograph's location and direction.
  - 2. Identification: Provide the following information with each image description in web-based Project management software site:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date photograph was taken.
    - f. Description of location, vantage point, and direction.
    - g. Unique sequential identifier keyed to accompanying key plan.

#### 1.3 QUALITY ASSURANCE

- A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.

#### 1.4 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.



- C. File Names: Name media files with date, Project area and sequential numbering suffix.

## 1.5 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified photographer to take construction photographs.
- B. General: Take photographs with maximum depth of field and in focus.
  - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
  - 1. Flag construction limits before taking construction photographs.
  - 2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
  - 3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
  - 1. Underground utilities.
  - 2. Underslab services.
  - 3. Piping.
  - 4. Electrical conduit.
  - 5. Waterproofing and weather-resistant barriers.
- E. Periodic Construction Photographs: Take 50 photographs monthly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- F. Final Completion Construction Photographs: Take 100 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.
- G. Additional Photographs: Architect or Owner may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum.
  - 1. Three working days' notice will be given, where feasible.
  - 2. In emergency situations, take additional photographs within 24 hours of request.
  - 3. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.
    - b. Immediate follow-up when on-site events result in construction damage or losses.
    - c. Substantial Completion of a major phase or component of the Work.
    - d. Extra record photographs at time of final acceptance.
    - e. Owner's request for special publicity photographs.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION**

## SECTION 01 33 00 - SUBMITTAL PROCEDURES

### GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 01 31 00 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
2. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 01 32 33 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
4. Section 01 40 00 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 01 77 00 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
8. Section 01 79 00 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### 1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not

Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

### 1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, a list of submittals, arranged in chronological order by dates required by construction schedule.
1. Include action submittals specified in individual sections including Product Data, Samples, Coordination drawings, shop drawings and mockups.
  2. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates.
  3. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
  4. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
    - a. Provide updated submittal schedule with each construction schedule update.
  5. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  6. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
  7. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal Category: Action; informational.
    - d. Name of subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for Architect's final release or approval.
- B. Architect will not begin processing or reviewing any submittals without a submittal schedule as specified herein.

### 1.4 SUBMITTAL FORMATS

- A. Submittal Information: Include Contractor cover sheet.
1. Contractor Cover sheet: Include the following on the Contractor cover sheet for each submittal:
    - a. Contractor Review stamp indicating Contractor review action.
    - b. Project name.
    - c. Date.
    - d. Name of Architect.
    - e. Name of Contractor.
    - f. Name of firm or entity that prepared submittal.

- g. Names of subcontractor, manufacturer, and supplier.
  - h. Unique submittal number, including revision identifier.
    - 1) Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
  - i. Category and type of submittal.
  - j. Submittal purpose and description.
  - k. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
  - l. Applicable drawing number and detail and/or schedule references.
  - m. Indication of full or partial submittal.
  - n. Indication fo related or concurrent submittals where applicable.
  - o. Location(s) where product is to be installed, as appropriate.
  - p. Other necessary identification.
  - q. Remarks.
  - r. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Submittals Utilizing Web-Based Project Software: Prepare submittals as PDF files or other format indicated by Project management software.
- E. Architect will return without review submittals received from Contractor lacking full and complete submittal information specified herein.

## 1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
- 1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- B. Sequence: Prepare and submit submittals required by each individual Specification Sections in the following sequence:
- 1. Product Data
  - 2. Informational Submittals.
  - 3. Sample for selection.
  - 4. Sample for Verification.
  - 5. Coordination drawings.
  - 6. Shop Drawings
  - 7. Mock ups.
  - 8. Architect reserves the right to withhold action on a submittal not prepared and submitted in accordance with the sequence specified herein.

- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
      - 1) Architect will notify Contractor within three working days following receipt of submittal.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 15 working days for review of each resubmittal.
  4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 working days for initial review of each submittal.
  5. Concurrent Consultant Review: Where requested by the Architect or required in the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 working days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
    - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- E. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
  2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
  3. Resubmit submittals until they are marked with accepted notation from Architect's action stamp.
  4. Architect review of resubmittal is limited to one.
    - a. General Contractor shall reimburse architect for review time for resubmittals following initial re-submittal review.

- 1) Reimbursement amount shall be Time and Expense, based on Architect's current hourly rate.
- F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- G. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## 1.6 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Color charts compliant with individual Specification Section requirements.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams that show factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- B. Shop Drawings: Prepare every submittal required by individual Specification Sections to include Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Architect reserves the right to withhold action on a submittal not prepared and submitted in accordance with Project-specific information as specified herein.
  2. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.

- g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
- 1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
  - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number.
    - b. Generic description of Sample.
    - c. Product name and name of manufacturer.
    - d. Sample source.
    - e. Number and title of applicable Specification Section.
    - f. Specification paragraph number and generic name of each item.
  - 3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
  - 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  - 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  - 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit three sets of Samples. Architect will retain one Sample sets; remainder will be forwarded, one to Owner, the other to Contractor. Contractor to mark up and retain one returned Sample set as a project record Sample.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.



- 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  2. Manufacturer and product name, and model number if applicable.
  3. Number and name of room or space.
  4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
  2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
  3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
  4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
  5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
  6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of

- compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
  3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
  4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
  5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
  6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
    - a. Name of evaluation organization.
    - b. Date of evaluation.
    - c. Time period when report is in effect.
    - d. Product and manufacturers' names.
    - e. Description of product.
    - f. Test procedures and results.
    - g. Limitations of use.

#### 1.7 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file] and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## 1.8 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp on the submittal Cover sheet. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
  - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

## 1.9 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.
  - 1. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.
    - a. Actions taken by indication on Project management software website have the following meanings:
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements specified. Architect will forward each submittal to appropriate party.
- C. Architect will return without review submittals non-compliant with requirements specified herein.
  - 1. Architect will notify Contractor of noncompliant submittals within processing time frame.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- F. Architect will return without review submittals received from sources other than Contractor.
- G. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION**

## SECTION 01 40 00 - QUALITY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

#### 1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
  - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
  2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
  3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" shall have the same meaning as the term "testing agency."
- H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

### 1.3 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Statement: Submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

### 1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting

requirements that are different, but apparently equal, to Architect for clarification before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

#### 1.5 ACTION SUBMITTALS

- A. Mockup Shop Drawings: For exterior envelope mockups, and mockups specified in individual specification sections.
  - 1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
    - a. Use details included in the drawings.
  - 2. Indicate manufacturer and model number of individual components.
  - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
  - 2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Entity responsible for performing tests and inspections.
  - 3. Description of test and inspection.
  - 4. Identification of applicable standards.
  - 5. Identification of test and inspection methods.
  - 6. Number of tests and inspections required.
  - 7. Time schedule or time span for tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.
- D. Reports: Prepare and submit certified written reports and documents as specified.

- E. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

## 1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, telephone number, and email address of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, telephone number, and email address of technical representative making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.
  - 3. Statement that products at Project site comply with requirements.
  - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 6. Statement of whether conditions, products, and installation will affect warranty.
  - 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, telephone number, and email address of factory-authorized service representative making report.
  - 2. Statement that equipment complies with requirements.
  - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.

4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

## 1.8 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged in the activities indicated.
  1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. **Testing and Inspecting Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.



- J. Interior Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Mockups are treated as an action submittal in accordance with Specification Section 01 33 00 "Submittal Procedures."
  2. Build mockups of size indicated and where not indicated at direction of the Architect.
  3. Build mockups in location indicated or, if not indicated, as directed by Architect.
  4. Notify Architect and Construction Manager seven working days in advance of dates and times when mockups will be constructed.
  5. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
  6. Demonstrate the proposed range of aesthetic effects and workmanship.
  7. Obtain Architect's and Construction Manager's approval of mockups before starting corresponding Work, fabrication, or construction.
    - a. Allow seven working days for initial review and each re-review of each mockup.
  8. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
  9. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  10. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  11. Incorporate Mockup construction and review in the Submittal schedule as specified in Specification Section 01 33 00 "Submittal Procedures"
  12. Demolish and remove mockups when directed unless otherwise indicated.
- K. Exterior Wall Assembly Mockups: Construct integrated exterior mockup as directed by the Architect. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.
1. Coordinate construction of the mockup to allow observation of exterior studs, sheathing, weather barrier installation, flashings, weather barrier integration with veneers fenestration systems, veneer including all drainage assemblies.

## 1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
  2. Costs for retesting and re-inspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Engage a qualified testing agency to perform quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- F. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspections.
  3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
  4. Facilities for storage and field curing of test samples.
  5. Delivery of samples to testing agencies.
  6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and inspection equipment at Project site.

- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

#### 1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency with a special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections included with the drawings:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
  - 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
  - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  - 5. Interpreting tests and inspections, and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
  - 6. Retesting and reinspecting corrected Work.

#### PART 2 - PRODUCTS (Not Used)

#### PART 3 - EXECUTION

##### 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  - 1. Date test or inspection was conducted.
  - 2. Description of the Work tested or inspected.
  - 3. Date test or inspection results were transmitted to Architect.
  - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and authorities' having jurisdiction reference during normal working hours.
  - 1. Submit log at Project closeout as part of Project Record Documents.

### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF SECTION**

## SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

#### 1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Site Plan: Submit plan to Owner and Architect showing temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire prevention program.

#### 1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

#### 1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch-OD top rails.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide concrete bases for supporting posts.

### 2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Meeting Room: Of sufficient size to accommodate needs of Owner, Architect, and construction, personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

### 2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
  - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - 1. Install electric power service in accordance with City of Greenville ordinances.
- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
  - 1. Provide additional telephone lines for the following:
    - a. Provide a dedicated telephone line for each facsimile machine in each field office.
  - 2. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.

### Temporary Facilities and Controls

- c. Contractor's home office.
  - d. Contractor's emergency after-hours telephone number.
  - e. Architect's office.
  - f. Engineers' offices.
  - g. Owner's office.
  - h. Principal subcontractors' field and home offices.
3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- J. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access project electronic documents and maintain electronic communications. Equip computer with not less than the following:
1. Processor: Intel Pentium D or Intel CoreDuo, 3.0 GHz processing speed.
  2. Memory: 4 gigabyte.
  3. Disk Storage: 300 gigabyte hard-disk drive and combination DVD-RW/CD-RW drive.
  4. Display: 22-inch LCD monitor with 128 Mb dedicated video RAM.
  5. Network Connectivity: 10/100BaseT Ethernet.
  6. Productivity Software:
    - a. Microsoft Office Professional, XP or higher, including Word, Excel, and Outlook.
    - b. Adobe Reader 7.0 or higher.
    - c. WinZip 7.0 or higher.
  7. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
  8. Internet Service: Broadband modem, router and ISP, equipped with hardware firewall, providing minimum 384 Kbps upload and 1 Mbps download speeds at each computer.
  9. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.



1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312000 "Earth Moving."
  3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
  4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 321216 "Asphalt Paving."
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
  2. Remove snow and ice as required to minimize accumulations.
- F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  2. Maintain and touchup signs so they are legible at all times.
- G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Division 01 "Execution."
- H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- I. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- J. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- G. Site Enclosure Fence: [Before construction operations begin] [Prior to commencing earthwork], furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
  - 1. Extent of Fence: [As required to enclose entire Project site or portion determined sufficient to accommodate construction operations] [As indicated on Drawings].
  - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

#### **Temporary Facilities and Controls**

1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.
  1. Prohibit smoking in construction areas.
  2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

### 3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  2. Keep interior spaces reasonably clean and protected from water damage.
  3. Discard or replace water-damaged and wet material.
  4. Discard, replace, or clean stored or installed material that begins to grow mold.
  5. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
  1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  2. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

### 3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 "Closeout Procedures."

**END OF SECTION**

## SECTION 01 60 00 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
  - 2. Section 01 77 00 "Closeout Procedures" for submitting warranties.

#### 1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
  - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
  - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
  - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
  - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 "Submittal Procedures."
- F. Substitution: Refer to Section 01 25 00 "Substitution Procedures" for definition and limitations on substitutions.

### 1.3 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
  - 1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
  - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
    - a. Name of product and manufacturer.
    - b. Model and serial number.
    - c. Capacity.
    - d. Speed.
    - e. Ratings.
  - 3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

#### 1.4 COORDINATION

- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

#### 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.
- C. Storage:
  - 1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
  - 2. Store products to allow for inspection and measurement of quantity or counting of units.
  - 3. Store materials in a manner that will not endanger Project structure.
  - 4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
  - 5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  - 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  - 7. Protect stored products from damage and liquids from freezing.
  - 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

#### 1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.

2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
  3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect will make selection.
  5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
  2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
  3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.



- a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
  - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
  - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
  - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
  - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
  - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
  - a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 25 00 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or

texture from manufacturer's product line that includes both standard and premium items.

- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
  - 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
  - 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
  - 3. Evidence that proposed product provides specified warranty.
  - 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
  - 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 01 33 00 "Submittal Procedures."
  - 1. Form of Approval of Submittal: As specified in Section 01 33 00 "Submittal Procedures."
  - 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

**END OF SECTION**

## SECTION 01 73 00 - EXECUTION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner's portion of the Work.
  - 6. Coordination of Owner-installed products.
  - 7. Progress cleaning.
  - 8. Starting and adjusting.
  - 9. Protection of installed construction.
- B. Related Requirements:
  - 1. Section 01 33 00 "Submittal Procedures" for submitting surveys.
  - 2. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

#### 1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

#### 1.3 PREINSTALLATION MEETINGS

- A. Layout Conference: Conduct conference at Project site.
  - 1. Prior to establishing layout of new perimeter and structural column grid(s), review building location requirements. Review benchmark, control point, and layout and dimension requirements. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with Project layout to attend, including the following:
    - a. Contractor's superintendent.
    - b. Professional surveyor responsible for performing Project surveying and layout.
    - c. Professional engineer responsible for performing site survey serving as basis for Project design.

2. Review meanings and intent of dimensions, notes, terms, graphic symbols, and other layout information indicated on the Drawings.
3. Review requirements for including layouts on Shop Drawings and other submittals.
4. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certified Surveys: Submit two copies signed by land surveyor.
- C. Certificates: Submit certificate signed by land surveyor, certifying that location and elevation of improvements comply with requirements.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

#### 1.6 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
- B. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework,

investigate and verify the existence and location of underground utilities, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
  2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 01 31 00 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. Engage a land surveyor experienced in laying out the Work, using the following accepted surveying practices:

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  2. Establish limits on use of Project site.
  3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  4. Inform installers of lines and levels to which they must comply.
  5. Check the location, level and plumb, of every major element as the Work progresses.
  6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

### 3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
  2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- D. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
  - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

### 3.5 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb, and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.
  3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.
  - J. Repair or remove and replace damaged, defective, or nonconforming Work.
    1. Comply with Section 01 77 00 "Closeout Procedures" for repairing or removing and replacing defective Work.

### 3.6 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.
  1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  2. Preinstallation Conferences: Include Owner's construction personnel and Owner's separate contractors at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.7 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.



- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements."

### 3.9 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

**END OF SECTION**

## SECTION 01 77 00 - CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
- B. Related Requirements:
  - 1. Section 01 32 33 "Photographic Documentation" for submitting Final Completion construction photographic documentation.
  - 2. Section 01 78 23 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
  - 3. Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

#### 1.2 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

## 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 working days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
    - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's Owner's signature for receipt of submittals.
  - 5. Submit testing, adjusting, and balancing records.
  - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 working days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 3. Complete startup and testing of systems and equipment.
  - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
  - 6. Advise Owner of changeover in utility services.
  - 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  - 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 9. Complete final cleaning requirements.
  - 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

### Closeout Procedures

- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 working days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.

## 1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 01 29 00 "Payment Procedures."
  2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Submit pest-control final inspection report.
  5. Submit Final Completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 working days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.8 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
  2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.

- b. Date.
- c. Name of Architect.
- d. Name of Contractor.
- e. Page number.
4. Submit list of incomplete items in the following format:
  - a. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

## 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 working days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  1. Submit by uploading to web-based project software site.
- E. Provide additional copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## PART 3 - EXECUTION

### 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
    - i. Vacuum and mop concrete.
    - j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - l. Remove labels that are not permanent.
    - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - p. Clean ducts, blowers, and coils.
      - 1) Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.
    - q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
    - r. Clean strainers.
    - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

- D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations required by Section 01 73 00 "Execution" before requesting inspection for determination of Substantial Completion.

**END OF SECTION**



## SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory manuals.
  - 2. Emergency manuals.
  - 3. Systems and equipment operation manuals.
  - 4. Systems and equipment maintenance manuals.
  - 5. Product maintenance manuals.
- B. Related Requirements:
  - 1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### 1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
  - 1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
  - 2. Submit three paper copies. Architect will return two copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 calendar days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 business days before commencing demonstration and training. Architect will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 business days of receipt of Architect's comments and prior to commencing demonstration and training.
- E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

#### 1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
  - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
  - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
  - 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.

5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversized drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

#### 1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information:
  1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Construction Manager.
  7. Name and contact information for Architect.
  8. Name and contact information for Commissioning Authority.
  9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
  2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
  3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

## 1.7 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
  2. Flood.
  3. Gas leak.
  4. Water leak.
  5. Power failure.
  6. Water outage.
  7. System, subsystem, or equipment failure.
  8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

## 1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.

- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

#### 1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.

2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
- I. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of maintenance manuals.
- 1.10 PRODUCT MAINTENANCE MANUALS
- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
1. Product name and model number.
  2. Manufacturer's name.
  3. Color, pattern, and texture.
  4. Material and chemical composition.
  5. Reordering information for specially manufactured products.

- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION**



## SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Section 01 73 00 "Execution" for final property survey.
  - 2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
  - 3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### 1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up record prints.
- B. Record Specifications: Submit annotated PDF electronic files and 2 paper copies of Project's Specifications, including addenda and Contract modifications.

#### 1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding photographic documentation.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:

- a. Dimensional changes to Drawings.
  - b. Revisions to details shown on Drawings.
  - c. Depths of foundations.
  - d. Locations and depths of underground utilities.
  - e. Revisions to routing of piping and conduits.
  - f. Revisions to electrical circuitry.
  - g. Actual equipment locations.
  - h. Duct size and routing.
  - i. Locations of concealed internal utilities.
  - j. Changes made by Change Order or Construction Change Directive.
  - k. Changes made following Architect's written orders.
  - l. Details not on the original Contract Drawings.
  - m. Field records for variable and concealed conditions.
  - n. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file with comment function enabled.
  2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  3. Refer instances of uncertainty to Architect for resolution.
  4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
    - a. See Section 01 31 00 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
    - b. Architect will provide data file layer information. Record markups in separate layers.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Format: Annotated PDF electronic file with comment function enabled.
  3. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.

**Project Record Documents**

e. Name of Contractor.

#### 1.4 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Note related Change Orders and Record Drawings where applicable.
- B. Format: Submit record specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Specifications.

#### 1.5 RECORD PRODUCT DATA

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - 3. Note related Change Orders and Record Drawings where applicable.
- C. Format: Submit Record Product Data as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up paper copy of Product Data.
  - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

#### 1.6 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
  - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.7 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

**END OF SECTION**

## SECTION 04 72 00 - CAST STONE MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Trim units.
  - 2. Accessories.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
- C. Samples:
  - 1. For each color and texture of cast stone required, 4 inches square in size.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Material test reports.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by CSI or APA or PCI for Group A, Category AT.

### PART 2 - PRODUCTS

#### 2.1 CAST STONE UNITS

- A. Cast Stone Units: Comply with ASTM C1364.
  - 1. Units are manufactured using the manufacturer's selected method.
  - 2. Trim units including items as indicated on Drawings.
- B. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
  - 1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
  - 2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
  - 3. Provide drips on projecting elements unless otherwise indicated.
- C. Cure Units as Follows:

1. Cure units in enclosed, moist curing room at 95 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
2. Keep units damp and continue curing to comply with one of the following:
  - a. No fewer than five days at mean daily temperature of 70 deg F or above.
- D. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
- E. Colors and Textures: As selected by Architect from manufacturer's full range.

## 2.2 ACCESSORIES

- A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666
- B. Dowels: 1/2-inch- diameter round bars, fabricated from Type 304 stainless steel complying with ASTM A240/A240M, ASTM A276/A276M, or ASTM A666.

## 2.3 MORTAR MIXES

- A. Comply with ASTM C270, Proportion Specification.
  1. For setting mortar, use Type N.
- B. Preblended dry mortar mix complying with ASTM C1714/C1714M and capable of producing mortar strength as indicated in ASTM C270.
  1. For setting mortar, use Type N.

## PART 3 - EXECUTION

### 3.1 SETTING CAST STONE IN MORTAR

- A. Set cast stone as indicated on Drawings. Set units accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.
- B. Set units in full bed of mortar with full head joints unless otherwise indicated.
  1. Fill dowel holes and anchor slots with epoxy.
  2. Fill collar joints solid as units are set.
  3. Build concealed flashing into mortar joints as units are set.
- C. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.
- D. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.

### 3.2 INSTALLATION TOLERANCES

- A. Variation from Plumb: Do not exceed 1/4 inch in 10 ft., or 1/2 inch maximum.
- B. Variation from Level: Do not exceed 1/4 inch in 10 ft., or 1/2 inch maximum.

- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

### 3.3 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
  - 1. Remove mortar fins and smears before tooling joints.
  - 2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
  - 3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
  - 5. Clean cast stone by methods described in Cast Stone Institute Technical Bulletin #39.

**END OF SECTION**

## SECTION 04 85 31 - NATURAL STONE MASONRY VENEER

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Natural Stone masonry anchored to unit masonry backup.

B. Products Installed but Not Furnished under This Section Include:

1. Steel lintels in unit masonry.
2. Steel shelf angles for supporting unit masonry.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each variety of stone, stone accessory, and manufactured product.

B. Samples for and Selection:

1. For each stone type indicated.
2. For each color of mortar required.

C. Samples for Verification:

1. For each stone type indicated.
2. For each color of mortar required.

D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and installation workmanship.

1. Include all stone unit types and sizes to be used including a typical corner condition, special shapes and mortar joint treatment.
2. Size: 48" x 48".
3. Clean the sample panel using the same materials and tools as planned for the final stone masonry construction
4. Do not proceed with remaining work until workmanship and color is approved by Architect.
5. Do not remove sample panel until construction activities of this section have been accepted by the Architect

#### 1.3 FIELD CONDITIONS

A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried.



- C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 FULL VENEER NATURAL STONE

- A. Material Standard: Comply with ASTM C616/C616M.
  - 1. Maximum Absorption in accordance with ASTM C97/C97M: 7.5 percent.
  - 2. Minimum Compressive Strength in accordance with ASTM C170/C170M: 4000 psi.
- B. Varieties and Sources: Subject to compliance with requirements, available stone varieties that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Arkosic Sandstone in textures and shapes indicated.
    - a. Material as selected by Architect from manufacturer's full range of options.

### 2.2 MORTAR MATERIALS

- A. Masonry Cement: ASTM C91/C91M.
  - 1. Type S.
  - 2. Color: As selected by Architect from manufacturer's full range of options.
- B. Mortar Pigments: Where pigmented/color mortar is indicated, provide Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in stone masonry mortar.
- C. Water: Potable.

### 2.3 VENEER ANCHORS

- A. Materials:
  - 1. Stainless Steel Wire: ASTM A580/A580M, Type 304.
  - 2. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.
- B. Size: Sufficient to extend at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least a 5/8-inch cover on exterior face.
- C. Adjustable Masonry-Veneer Anchors:
  - 1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
  - 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.078-inch-thick, stainless steel sheet.
  - 3. Fabricate wire ties from 0.187-inch-diameter, stainless steel wire unless otherwise indicated.

4. Fabricate wire connector sections from 0.187-inch- diameter, stainless steel wire.
5. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
6. Masonry-Veneer Anchors; Double-Pintle Plate: Rib-stiffened, sheet metal anchor section with screw holes at top and bottom, projecting horizontal leg with slots for vertical legs of double pintle wire tie Masonry-Veneer Anchors; Slotted Plate: Sheet metal anchor section, with screw holes at top and bottom; and raised rib-stiffened strap, stamped into center to provide a slot between strap and base for wire tie. Use self-adhering tape to seal penetration behind anchor plate.
7. Masonry-Veneer Anchors; Slotted Plate with Prongs: Sheet metal anchor section, with screw holes at top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation; and raised rib-stiffened strap, stamped into center to provide a slot between strap and base for wire tie. Use self-adhering tape to seal penetration behind anchor plate.

## 2.4 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
  1. Stainless Steel: ASTM A240/A240M, Type 304, 0.016 inch thick.
  2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet Provide splice plates at joints of formed, smooth metal flashing.
- B. Flexible Flashing: For flashing unexposed to the exterior, use one of the following unless otherwise indicated:
  1. Copper-Laminated Flashing: 7-oz./sq. ft. copper sheet bonded with asphalt between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
  2. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive, rubberized-asphalt compound, bonded to a high-density, cross-laminated, polyethylene film to produce an overall thickness of not less than 0.040 inch

## 2.5 FABRICATION

- A. Cut or Select stone to produce pieces of thickness, size, and shape indicated on Drawings.
  1. Shape stone specified to be laid in three-course, random range ashlar pattern with sawed beds.
- B. Thickness of Stone: Provide thickness indicated, but not less than the following:
  1. Thickness: 4 inches plus or minus 1/4 inch. Thickness does not include projection of pitched faces.
- C. Finish exposed stone faces and edges to comply with requirements indicated for finish and to match approved samples.
  1. Finish: As indicated.

2. Finish for Lintels: Smooth.

## 2.6 MORTAR MIXES

- A. General: Do not use admixtures unless otherwise indicated.
  1. Do not use calcium chloride.
  2. Use masonry cement mortar unless otherwise indicated.
  3. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
- B. Mortar for Stone Masonry: Comply with ASTM C270, Proportion Specification.
  1. Mortar for Setting Stone: Type S.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Accurately mark stud centerlines on face of weather-resistant sheathing paper before beginning stone installation.
- B. Coat concrete and unit masonry backup with asphalt dampproofing.

### 3.2 INSTALLATION OF STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
  1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
  2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
  3. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in three-course, random-range ashlar pattern with random course heights, random lengths (interrupted coursed), and uniform joint widths.
- D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- E. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 1/4 inch at widest points.

### 3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 3/8 inch in 20 feet. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or more.

### 3.4 INSTALLATION OF STONE MASONRY

- A. Anchor stone masonry to unit masonry with wire anchors unless otherwise indicated. Connect anchors to masonry joint reinforcement with vertical rods inserted through anchors and through eyes of masonry joint reinforcement projecting from unit masonry.
- B. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least a 5/8-inch cover on exterior face.
- C. Space anchors not more than 18 inches o.c. vertically and 32 inches o.c. horizontally, with not less than one anchor per 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings, sealant joints, and perimeter at intervals not exceeding 12 inches.
- D. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.
- E. Fill collar joint with mortar as stone is set.
- F. Rake out joints for pointing with mortar to depth of not less than 1/2 inch before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

### 3.5 POINTING

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.
- B. Point stone joints by placing and compacting pointing mortar in layers of not more than 3/8 inch deep. Compact each layer thoroughly and allow to it become thumbprint hard before applying next layer.
- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
  - 1. Joint Profile: Smooth, flat face slightly below edges of stone.

### 3.6 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
  - 5. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20, Revised II, using job-mixed detergent solution.

### 3.7 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
  - 1. Do not dispose of masonry waste as fill within 18 inches of finished grade.

**END OF SECTION**

## SECTION 05 52 13 - PIPE AND TUBE RAILINGS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Steel railings.

#### 1.2 ACTION SUBMITTALS

- A. Product Data:
  - 1. Manufacturer's product lines of mechanically connected railings.
  - 2. Shop primer.
  - 3. Intermediate coats and topcoats.
  - 4. Nonshrink, nonmetallic grout.
  - 5. Metal finishes.
  - 6. Paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish.
- D. Delegated Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.3 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
  - 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Railings, including attachment to building construction, withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails:
    - a. Uniform load of 50 lbf/ ft. applied in any direction.
    - b. Concentrated load of 200 lbf applied in any direction.

- c. Uniform and concentrated loads need not be assumed to act concurrently.

## 2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

## 2.3 STEEL RAILINGS

- A. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

## 2.4 FASTENERS

- A. Fastener Materials:
  - 1. Ungalvanized-Steel Railing Components: Plated steel fasteners complying with ASTM F1941/ASTM F1941M, Class Fe/Zn 5 for zinc coating.
  - 2. Stainless Steel Railing Components: Type 304 stainless steel fasteners.
- B. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or ICC-ES AC308.
  - 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

## 2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.
  - 1. For stainless steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- D. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
- E. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
- F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## 2.6 FABRICATION

- A. Cut, drill, and punch metals cleanly and accurately.

1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
2. Remove sharp or rough areas on exposed surfaces.
- B. Form work true to line and level with accurate angles and surfaces.
- C. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove flux immediately.
  4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint.
- D. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- E. Form changes in direction as follows:
  1. By bending or by inserting prefabricated elbow fittings.
- F. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- G. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
- H. For railing posts set in concrete, provide stainless steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

## 2.7 STEEL AND IRON FINISHES

- A. For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, hot-dip galvanize anchors to be embedded in exterior concrete or masonry.
- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below:
  1. Exterior Railings: SSPC-SP 6/NACE No. 3.
- C. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1 for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
- D. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1 for shop painting. Apply at spreading rates recommended by coating manufacturer.
  1. Color: As selected by Architect from manufacturer's full range.



## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Perform cutting, drilling, and fitting required for installing railings.
  - 1. Fit exposed connections together to form tight, hairline joints.
  - 2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
  - 3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
  - 4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
  - 5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
  - 6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
  - 1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

### 3.2 ANCHORING POSTS

- A. Use stainless steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

### 3.3 CLEANING

- A. Clean railing by washing thoroughly with clean water and soap and rinsing with clean water.

**END OF SECTION**

## SECTION 05 75 00 - DECORATIVE FORMED METAL CAPS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Beam caps.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including finishing materials.

B. Shop Drawings: Show fabrication and installation details for decorative formed metal.

1. Include plans, elevations, component details, and attachment details.
2. Indicate materials and profiles of each decorative formed metal member, fittings, joinery, finishes, fasteners, anchorages, and accessory items.

C. Samples: Full size sample of beam cap.

### PART 2 - PRODUCTS

#### 2.1 SHEET METAL

A. General: Fabricate products from sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections where exposed to view on finished units.

B. Galvanized-Steel Sheet: ASTM A653/A653M, G90 coating, either commercial steel or forming steel.

#### 2.2 MISCELLANEOUS MATERIALS

A. Sealants, Exterior: Elastomeric sealant as recommended in writing by decorative formed metal manufacturer.

B. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated.

1. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

C. Anchor Materials:

D. Laminating Adhesive: Adhesive recommended by metal fabricator that will fully bond metal to metal and is noncombustible after curing.

E. Isolation Coating: Manufacturer's standard epoxy coating.

## 2.3 PAINTS AND COATINGS

- A. Zinc rich epoxy Shop Primer for Ferrous Metal compatible with epoxy intermediate coat.
- B. Epoxy intermediate coat.
- C. Polyurethane topcoat.

## 2.4 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble decorative formed metal items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

## 2.5 BEAM CAPS

- 1. Steel Sheet: 0.060 inch.
  - a. Finish: Factory primed.

## 2.6 STEEL SHEET FINISHES

- A. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or with SSPC-SP 8, "Pickling."
- B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply shop primer to prepared surfaces of items unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Locate and place decorative formed metal items level and plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install decorative formed metal.
- B. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers as indicated.
- C. Corrosion Protection: Apply bituminous paint or other permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with substrate materials that are incompatible or could result in corrosion or deterioration of either material or finish.

- D. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

**END OF SECTION**

## SECTION 06 15 16 - WOOD ROOF DECKING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes Tongue and groove wood roof decking

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Research/Evaluation Reports: For glued-laminated wood roof decking indicated to be of diaphragm design and construction, from ICC-ES.

### PART 2 - PRODUCTS

#### 2.1 WOOD ROOF DECKING, GENERAL

- A. General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

#### 2.2 SOLID-SAWN WOOD ROOF DECKING

- A. Standard for Solid-Sawn Wood Roof Decking: Comply with AITC 112.
- B. Douglas fir-larch, Douglas fir-larch (North).
- C. Roof Decking Nominal Size: 2 by 6.
- D. Roof Decking Grade: Commercial Decking or Commercial Dex.
- E. Grade Stamps: Factory mark each item with grade stamp of grading agency. Apply grade stamp to surfaces that are not exposed to view.
- F. Moisture Content: Provide wood roof decking with 19 percent maximum moisture content at time of dressing.
- G. Face Surface: Smooth.
- H. Edge Pattern: Tongue and Groove.

#### 2.3 ACCESSORY MATERIALS

- A. Fastener Material: Hot-dip galvanized steel.

2.4 FINISH

- A. Apply stain finish as indicated in the drawings and compliant with Division 09 “ Staining and Transparent Finishes.
- B. Stain color as selected by the Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install solid-sawn wood roof decking to comply with AITC 112.
  - 1. Locate end joints for lay-up indicated.
- B. Anchor wood roof decking, where supported on walls, with bolts as indicated.

3.2 PROTECTION

- A. Provide water-resistive barrier over roof decking as the Work progresses to protect roof decking until roofing is applied.

**END OF SECTION**

## SECTION 07 41 13.16 - STANDING-SEAM METAL ROOF PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

##### A. Section Includes:

1. Vertical-rib, snap-joint, standing-seam metal roof panels.
2. Roof Sheathing.
3. Underlayment.
4. Flashing.
5. Gutters and Downspouts.

#### 1.2 ACTION SUBMITTALS

##### A. Product data.

##### B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Certificates for portable roll-forming equipment.
- B. Product test reports.
- C. Sample warranties.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.5 QUALITY ASSURANCE

- A. Roof installer qualifications.

#### 1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  1. Warranty Period: Two years from date of Substantial Completion.

- B. Special Warranty on Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E1592:
  - 1. Wind Loads: As indicated on Drawings.
  - 2. Other Design Loads: As indicated on Drawings.
  - 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E1646 or ASTM E331 at the following test-pressure difference:
- C. Watertightness: No water penetration when tested in accordance with ASTM E2140 for hydrostatic-head resistance.
- D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
  - 1. Uplift Rating: UL 90.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

### 2.2 STANDING-SEAM METAL ROOF PANELS, GENERAL

- A. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

### 2.3 VERTICAL-RIB, SNAP-JOINT, STANDING-SEAM METAL ROOF PANELS

- A. Panels: Formed with vertical ribs at panel edges; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.
  - 1. Structural Support: Over solid deck.
  - 2. Material: Metallic-coated steel.
  - 3. Panel Profile: Flat pan.
  - 4. Panel Coverage: 16 inches.
  - 5. Panel Height: 1.5 inches.
  - 6. Clips: One piece, fixed, designed to accommodate thermal movement.



- a. Steel Clips: 0.028-inch- nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
- b. Clip Spacing: 24 inches.

## 2.4 ROOF SHEATHING

- A. Plywood Sheathing, Roofs: Either DOC PS 1 or DOC PS 2, Exterior sheathing.
  1. Thickness: No less than 5/8".
- B. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2[ for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground].
- C. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- D. For roof sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M or Type 304 stainless steel.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions for fastening substrate panel to roof deck.

## 2.5 UNDERLAYMENT

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
  1. Thermal Stability: Stable after testing at 240 deg F; ASTM D1970/D1970M.
  2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970/D1970M.

## 2.6 PANEL MATERIALS

- A. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with minimum ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with minimum ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
  1. Nominal Thickness: 0.034 inch.
  2. Surface: Smooth, flat finish.

## 2.7 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645; cold-formed, metallic-coated steel sheet, minimum ASTM A653/A653M, G90 hot-dip galvanized coating designation or ASTM A792/A792M, Class AZ50 coating designation. Provide

manufacturer's standard sections as required for support and alignment of metal panel system.

- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
  - 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
  - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, of size and metal thickness in accordance with manufacturer's recommendations. Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels.
- E. Downspouts: Formed from same material as roof panels. Fabricate in 10 ft. long sections, complete with formed elbows and offsets, of size and metal thickness in accordance with manufacturer's recommendations. Finish downspouts to match gutters.
- F. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- G. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
  - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
  - 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.

## 2.8 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- C. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations that apply to design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  - 3. Seams for other than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  - 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with manufacturer's recommendations.
  - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not permitted on faces of accessories exposed to view.
  - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
    - a. Size: As recommended by metal panel manufacturer for application, but not less than thickness of metal being secured.

## 2.9 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages in accordance with ASTM C754 and metal panel manufacturer's written installation instructions.

### 3.2 INSTALLATION OF ROOF SHEATHING

- A. General: Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
  - 1. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
  - 2. Securely attach to substrate by fastening as indicated, complying with the following:
    - a. Table 2304.10.1, "Fastening Schedule," in the ICC's International Building Code.
    - b. ICC-ES evaluation report for fastener.
  - 3. Coordinate [wall] [parapet] [and] [roof] sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- B. Fastening Method:
  - 1. Nail to wood decking.
  - 2. Space panels 1/8 inch apart at edges and ends.

### 3.3 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated on Drawings, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Extend underlayment into gutter trough. Roll laps with roller. Cover underlayment within 14 days.
  - 1. Apply over the entire roof surface.

### 3.4 INSTALLATION OF STANDING-SEAM METAL ROOF PANELS

- A. Install metal panels in accordance with manufacturer's written installation instructions and approved Shop Drawings in orientation, sizes, and locations indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Shim or otherwise plumb substrates receiving metal panels.
  - 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.

3. Install screw fasteners in predrilled holes.
  4. Locate and space fastenings in uniform vertical and horizontal alignment.
  5. Install flashing and trim as metal panel work proceeds.
  6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
  2. Do not penetrate wood decking.
- C. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners in accordance with manufacturers' written installation instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
1. Install clips to supports with self-tapping fasteners.
  2. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
  3. Watertight Installation:
    - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommended in writing by manufacturer as needed to make panels watertight.
    - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    - c. At panel splices, nest panels with minimum **6-inch** end lap, sealed with sealant and fastened together by interlocking clamping plates.
- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements and manufacturer's written installation instructions. Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
  2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
1. Connect downspouts to underground drainage system indicated.

### 3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION**

## SECTION 09 91 13 - EXTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Primers.
  - 2. Finish coatings.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of topcoat product.

#### 1.3 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

### PART 2 - PRODUCTS

#### 2.1 PAINT PRODUCTS, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.
- B. Colors: As indicated in a color schedule.

#### 2.2 PRIMERS

- A. Epoxy Metal Primer: Corrosion-resistant, solvent-based, two-component epoxy primer formulated for use on prepared, exterior ferrous- and galvanized-metal surfaces.

#### 2.3 FINISH COATINGS

- A. High-Build Epoxy Paint, Low Gloss: High-solids, two-component epoxy; formulated for use on exterior concrete, masonry, and primed-metal surfaces.

1. Gloss and Sheen Level: Maximum gloss of 25 units at 60 degrees and sheen of 10 to 35 units at 85 degrees when tested in accordance with ASTM D523.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers.
- B. Proceed with coating application only after unsatisfactory conditions have been corrected.
  1. Application of coating indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems specified in this Section.

### 3.3 INSTALLATION

- A. Apply paints in accordance with manufacturer's written instructions.
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

### 3.4 CLEANING AND PROTECTION

- A. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.



- C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.5 EXTERIOR PAINTING SCHEDULE

- A. Steel and Iron Substrates:
  - 1. Water-Based, Light Industrial Coating System:
    - a. Prime Coat: Epoxy metal primer.
    - b. Intermediate Coat: High-build epoxy paint, low gloss.
    - c. Topcoat: Exterior, water-based, light industrial coating, low sheen.

**END OF SECTION**

## SECTION 09 93 00 - STAINING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Wood stains.
  - 2. Transparent Finishes.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each type of finish system and in each color and gloss of finish required.
- C. Product List: Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

#### 1.3 MOCKUPS

- A. Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under Sample submittals and to set quality standards for materials and execution.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- B. Stain Colors: As indicated in a color schedule.

#### 2.2 WOOD STAINS

- A. Stain, Exterior, Solvent Based, Semitransparent: Solvent-based, oil or oil/alkyd, semitransparent, pigmented stain for new wood surfaces.

#### 2.3 TRANSPARENT FINISHES

- A. Varnish, Marine Spar, Exterior, Gloss: Solvent-based, phenolic-modified clear varnish for exterior wood surfaces.

1. Gloss Level: Gloss of 70 to 85 units at 60 degrees when tested in accordance with ASTM D523.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Maximum Moisture Content of Exterior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- B. Maximum Moisture Content of Interior Wood Substrates: 10 percent, when measured with an electronic moisture meter.

#### 3.2 PREPARATION

- A. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
  1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- B. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.
  1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
  2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

#### 3.3 APPLICATION

- A. Apply finishes according to manufacturer's written instructions.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

#### 3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

**END OF SECTION**

## SECTION 334100 - STORM DRAINAGE SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes gravity-flow, nonpressure storm drainage [outside the building] with the following components:
  - 1. Special fittings for expansion and deflection.
  - 2. Backwater valves.
  - 3. Cleanouts.
  - 4. Pipe culverts.
  - 5. Drains.
  - 6. Corrosion-protection piping encasement.
  - 7. Drainage structures.
  - 8. Channel drainage systems.
  - 9. Outlet protection.
  - 10. Storage and leaching chambers.
  - 11. Manholes.
  - 12. Stormwater oil and sediment separators.

#### 1.3 DEFINITIONS

- A. CMP: Corrugated Metal Pipe (Steel)
- B. DIP: Ductile iron pipe
- C. Drainage Structures: catch basins, curb inlets, junction boxes, weir inlets, pond outlet structures.
- D. HDPE: High density polyethylene pipe
- E. LLDPE: Linear low-density, polyethylene plastic.
- F. NPS: Nominal pipe size
- G. PE: Polyethylene plastic.

- H. PP: Polypropylene plastic.
- I. PVC: Polyvinyl chloride plastic.
- J. SRCP: Reinforced Concrete Pipe (sealant joints)
- K. GRCP: Reinforced Concrete Pipe (gasket joints)

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: Pipe joints shall be at least silt-tight, unless otherwise indicated.

#### 1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Special pipe fittings.
  - 2. Backwater valves.
  - 3. Cleanouts.
  - 4. Pipe culverts.
  - 5. Drains.
  - 6. Corrosion protection piping encasement
  - 7. Channel drainage systems.
  - 8. Outlet protection
- B. Shop Drawings: Include plans, elevations, sections, details, and frames and covers for the following:
  - 1. Manholes.
  - 2. Drainage structures.
  - 3. Storage and leaching chambers.
  - 4. Stormwater oil and sediment separators
- C. Field quality-control test reports.
- D. Minutes of preinstallation conference.

#### 1.6 QUALITY ASSURANCE

- A. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
  - 1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.

- a. For locations within areas of DOT jurisdiction, perform all work, testing, and inspections in accordance with applicable DOT standards and procedures.
- B. Preinstallation Conference: Conduct conference to comply with requirements in Division 01 Section "Project Management and Coordination."
  1. Review methods and procedures related to storm drainage installation including, but not limited to, the following:
    - a. Review requirements of the authorities having jurisdiction.
    - b. Review site conditions and preparatory work.
    - c. Review requirements for protecting work.
    - d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - e. Review inspection schedule and procedures required to monitor and document quality assurance.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic materials in direct sunlight. Support to prevent sagging and bending.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes, drainage structures and pipe culverts according to manufacturer's written rigging instructions.

#### 1.8 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
  1. Notify Architect no fewer than two days in advance of proposed interruption of service.
  2. Do not proceed with interruption of service without Architect's written permission.

### PART 2 - PRODUCTS

#### 2.1 DUCTILE-IRON PIPE AND FITTINGS (DIP)

- A. Pipe: AWWA C151, for push-on joints.
- B. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints.

- C. Compact Fittings: AWWA C153, for push-on joints.
- D. Gaskets: AWWA C111, rubber.
- E. Corrosion Protection Encasement for Underground Metal Piping: ASTM A 674 or AWWA C105.
  - 1. Form: Tube.
  - 2. Material: LLDPE film of 0.008-inch minimum thickness.
  - 3. Color: Black.

## 2.2 STEEL PIPE AND FITTINGS (CMP)

- A. Corrugated-Steel Pipe and Fittings: ASTM A 760/A 760M, Type I with fittings of similar form and construction as pipe.
  - 1. Silt-tight Joint Bands: Corrugated steel with O-ring seals.
  - 2. Coating: Aluminum.

## 2.3 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS (HDPE)

- A. Corrugated HDPE Drainage Pipe and Fittings NPS 10 and Smaller: AASHTO M 252M, Type S, with smooth waterway for coupling joints
  - 1. Silt-tight Couplings: HDPE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings.
- B. Corrugated HDPE Pipe and Fittings NPS 12 to NPS 48: AASHTO M 294M, Type S, with smooth waterway for coupling or integral bell and spigot joints.
  - 1. Water-tight Couplings: Bell to bell HDPE couplers or integral bell and spigot joints with ASTM F 447, elastomeric seals that mate with pipe and fittings.
  - 2. Finished joint system shall meet the requirements of ASTM D 3212.
- C. Corrugated HDPE Pipe and Fittings NPS 56 and NPS 60: AASHTO MP7, Type S, with smooth waterway for integral bell and spigot joints.
  - 1. Water-tight Couplings: Integral bell and spigot joints with ASTM F 447, elastomeric seals that mate with pipe and fittings.
  - 2. Finished joint system shall meet the requirements of ASTM D 3212.

## 2.4 CORRUGATED POLYPROPYLENE PIPE (PP)

- A. Corrugated Polypropylene Pipe and Fittings

1. ADS HP Storm or approved equal with smooth waterway for coupling or integral bell and spigot joints.
  - a. NPS 12 to NPS 30: ASTM F 2736 and AASHTO M330.
  - b. NPS 36 to NPS 60: ASTM F 2881 and AASHTO M330.
  - c. Water-tight Couplings: Bell to bell HDPE couplers or integral bell and spigot joints with ASTM F 447, elastomeric seals that mate with pipe and fittings.
  - d. Finished joint system shall meet the requirements of ASTM D 3212.
  
- 2.5 POLYVINYL CHLORIDE PLASTIC PIPE AND FITTINGS (PVC)
  - A. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 26, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.
    1. Finished joint system shall meet the requirements of ASTM D 3212.
  
- 2.6 CONCRETE PIPE (GRCP and SRCP)
  - A. Reinforced-Concrete Sewer Pipe: ASTM C 76, with bell-and-spigot or groove and tongue ends.
    1. Class III, Wall B.
    2. Joints shall be as follows:
      - a. Where indicated as GRCP on Drawings: gasketed joints with ASTM C 443, rubber gaskets.
      - b. Where indicated as SRCP on Drawings: sealant joints with ASTM C 990, bitumen or butyl-rubber sealant.
  
- 2.7 ELLIPTICAL CONCRETE PIPE (ECP)
  - A. Reinforced-Concrete Elliptical Pipe: ASTM C 507, with bell-and-spigot or groove and tongue ends.
    1. Class HE-III, Wall B.
    2. Sealant joints with ASTM C 990, bitumen or butyl-rubber sealant.
  
- 2.8 CONCRETE BOX CULVERTS (CBC)
  - A. Reinforced-Concrete Box Sections: ASTM C 1433, with bell-and-spigot or groove and tongue ends.
    1. Table 1 load classification.
    2. Sealant joints with ASTM C 990, bitumen or butyl-rubber sealant.



## 2.9 GEOTEXTILES

- A. Pipe Joint Wrap Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
1. Width: Min. 18" or sufficient to extend beyond the joint and base of pipe bell at least 6 inches on each side.
  2. Length: One continuous piece of sufficient length to extend around the entire pipe circumference with a 12" overlap.
  3. Survivability: Class 1, Type A, B, or C; SCDOT Standard Specs
  4. Grab Tensile Strength: 90 lbf; ASTM D 4632.
  5. Puncture Strength: 60 lbf; ASTM D 4833.
  6. Trapezoidal Tear: 40 lbf; ASTM D-4533
  7. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751.
  8. Permittivity: 2.2 second-1, minimum; ASTM D 4491.
  9. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.
  10. Water Flow Rate: 150 gal/min/ft<sup>2</sup>; ASTM D-4491

## 2.10 NONPRESSURE-TYPE PIPE COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and stainless steel tension band and tightening mechanism on each end.
- B. Sleeve Materials:
1. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Unshielded Flexible Couplings: Elastomeric sleeve with stainless steel shear ring and stainless steel-metal tension band and tightening mechanism on each end.
1. Manufacturers:
    - a. Dallas Specialty & Mfg. Co.
    - b. Fernco Inc.
    - c. Logan Clay Products Company (The).
    - d. Mission Rubber Company; a division of MCP Industries, Inc.
    - e. NDS Inc.
    - f. Plastic Oddities, Inc.
- D. Ring-Type Flexible Couplings: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.
1. Manufacturers:

- a. Fernco Inc.
- b. Logan Clay Products Company (The).
- c. Mission Rubber Company; a division of MCP Industries, Inc.

## 2.11 SPECIAL PIPE FITTINGS FOR DEFLECTION AND EXPANSION

- A. Ductile-Iron Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include 2 gasketed ball-joint sections and 1 or more gasketed sleeve sections, rated for 250-psig minimum working pressure and for offset and expansion indicated.

1. Manufacturers:
  - a. EBAA Iron Sales, Inc.
  - b. Romac Industries, Inc.
  - c. Star Pipe Products.

## 2.12 BACKWATER VALVES

- A. Gray-Iron Backwater Valves: ASME A112.14.1, gray-iron body and bolted cover, with bronze seat.

1. Manufacturers:
  - a. Josam Company.
  - b. Smith, Jay R. Mfg. Co.
  - c. Wade Div.; Tyler Pipe.
  - d. Watts Industries, Inc.
  - e. Watts Industries, Inc.; Enpoco, Inc. Div.
  - f. Zurn Industries, Inc.; Zurn Specification Drainage Operation.
2. Horizontal Type: With swing check valve and hub-and-spigot ends.
3. Combination Horizontal and Manual Gate-Valve Type: With swing check valve, integral gate valve, and hub-and-spigot ends.
4. Terminal Type: With bronze seat, swing check valve, and hub inlet.

- B. PVC Backwater Valves: Horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

1. Manufacturers:
  - a. Canplas Inc.
  - b. IPS Corporation.
  - c. NDS Inc.
  - d. Plastic Oddities, Inc.
  - e. Sioux Chief Manufacturing Company, Inc.
  - f. Zurn Industries, Inc.; Zurn Light Commercial Specialty Plumbing Products.

## 2.13 CLEANOUTS

- A. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.
  - 1. Manufacturers:
    - a. Canplas Inc.
    - b. IPS Corporation.
    - c. NDS Inc.
    - d. Plastic Oddities, Inc.
    - e. Sioux Chief Manufacturing Company, Inc.
    - f. Zurn Industries, Inc.; Zurn Light Commercial Specialty Plumbing Products.
- B. Frame and Cover: Traffic grade cast-iron as indicated or, where not indicated, in accordance with the following:
  - 1. Use medium-duty, top-loading classification cleanouts in landscaped and foot-traffic areas.
  - 2. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
  - 3. Use extra-heavy-duty, top-loading classification cleanouts in roads areas.
- C. Concrete Collar: Where not located as a casting embedded in pavement, provide cast-in-place concrete collar as indicated on Drawings or, where not indicated 18 by 18 by 12 inches deep.

## 2.14 DRAINS

- A. Gray-Iron Area Drains: ASME A112.21.1M, round body with anchor flange and round[ secured] grate. Include bottom outlet with inside calk or spigot connection, of sizes indicated.
  - 1. Manufacturers:
    - a. Josam Company.
    - b. MIFAB Manufacturing, Inc.
    - c. Smith, Jay R. Mfg. Co.
    - d. Wade Div.; Tyler Pipe.
    - e. Watts Industries, Inc.
    - f. Watts Industries, Inc.; Enpoco, Inc. Div.
    - g. Zurn Industries, Inc.; Zurn Specification Drainage Operation.
  - 2. Top-Loading Classification(s): [Medium] [Medium and heavy] [Heavy] duty.

## 2.15 MANHOLES

- A. Standard Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
1. Diameter: 48 inches minimum or as required to accommodate pipe size, unless otherwise indicated.
  2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
  3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
  4. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
  5. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
  6. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  7. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
  8. Steps: Individual ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12 to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
  9. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.
  10. Flat Slab Adapters For Transition to Square Drainage Structures: Precast reinforced concrete in accordance with Section 719 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
    - a. Configuration: as indicated on South Carolina Department of Transportation Standard Drawing 719-425.
  11. Manhole Frames and Covers: Ferrous; 24 inch ID by 7 to 9 inch riser with 4 inch minimum width flange and 26 inch diameter cover. Include indented top design with lettering cast into cover, using wording or design required by agency having authority. Where no specific wording or design is required by agency, wording equivalent to "STORM SEWER" shall be cast.
    - a. Material: ASTM A 48, Class 35 gray iron, unless otherwise indicated.
    - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise

## 2.16 CONCRETE

- A. General: Class 3000 concrete in accordance with Section 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- B. Portland Cement Design Mix: 3000 psi minimum, with 0.45 maximum water-cementitious materials ratio.
  - 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  - 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

## 2.17 POLYMER-CONCRETE, CHANNEL DRAINAGE SYSTEMS

- A. Description, General: Modular system of precast, polymer-concrete channel sections, grates, and appurtenances; designed so grates fit into channel recesses without rocking or rattling. Include number of units required to form total lengths indicated.
- B. Manufacturers:
  - 1. ABT, Inc.
  - 2. ACO Polymer Products, Inc.
  - 3. Innovative Plastics Products, Inc.
  - 4. Mea-Josam Div.; Josam Company.
  - 5. Strongwell; Lenoir City Div.
- C. Sloped-Invert, Polymer-Concrete Systems: Include the following components:
  - 1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 4-inch inside width and deep, rounded bottom, with built-in invert slope of 0.6 percent and with outlets in number, sizes, and locations indicated. Include extension sections necessary for required depth.
    - a. Frame: Include gray-iron or steel frame for grate.
  - 2. Grates with manufacturer's designation "Heavy Duty," with slots or perforations that fit recesses in channels.
    - a. Material: Gray iron.
  - 3. Covers: Solid gray iron, if indicated.
  - 4. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
- D. Narrow-Width, Level-Invert, Polymer-Concrete Systems: Include the following components:

1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 5 inch inside width and 9-3/4-inch deep, rounded bottom, with level invert and with NPS 4 outlets in number and locations indicated.
  2. Grates with slots or perforations that fit recesses in channels.
    - a. Material: Gray iron.
  3. Covers: Solid gray iron, if indicated.
  4. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
- E. Wide-Width, Level-Invert, Polymer-Concrete Systems: Include the following components:
1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 8 inch inside width and 13-3/4 inch deep, rounded bottom, with level invert and with outlets in number, sizes, and locations indicated.
  2. Grates with slots or other openings that fit recesses in channels.
    - a. Material: Gray iron.
  3. Covers: Solid gray iron, if indicated.
  4. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.
- F. Drainage Specialties: Precast, polymer-concrete units
1. Large Catch Basins: 24 by 12-inch polymer-concrete body, with outlets in number and sizes indicated. Include gray-iron slotted grate.
    - a. Frame: Include gray-iron or steel frame for grate.
  2. Small Catch Basins: 19 to 24 inch by approximately 6 inch polymer-concrete body, with outlets in number and sizes indicated. Include gray-iron slotted grate.
    - a. Frame: Include gray-iron or steel frame for grate.
  3. Oil Interceptors: Polymer-concrete body with interior baffle and 4 steel support channels and two 1/4 inch thick, steel-plate covers.
    - a. Capacity: [140 gal.] [200 gal.] [260 gal.].
    - b. Inlet and Outlet: [NPS 4] [NPS 6].
  4. Sediment Interceptors: 27 inch square, polymer-concrete body, with outlets in number and sizes indicated. Include 24 inch square, gray-iron frame and slotted grate.
- G. Supports, Anchors, and Setting Devices: Manufacturer's standard, unless otherwise indicated.

- H. Channel-Section Joining and Fastening Materials: As recommended by system manufacturer.

## 2.18 PLASTIC, CHANNEL DRAINAGE SYSTEMS

- A. Description, General: Modular system of plastic channel sections, grates, and appurtenances; designed so grates fit into frames without rocking or rattling. Include number of units required to form total lengths indicated.

- B. Manufacturers:

1. ACO Polymer Prod.
2. MultiDrain Corp.
3. NDS Inc.
4. Tuf-Tite, Inc.
5. Zurn Industries, Inc.; Zurn Light Commercial Specialty Plumbing Products.

- C. Fiberglass Systems: Include the following components:

1. Channel Sections: Interlocking-joint, fiberglass modular units, with built-in invert slope of approximately 1 percent and with end caps. Include rounded or inclined inside bottom surface, with outlets in number, sizes, and locations indicated.
  - a. Width: [6 inches] [6 or 8 inches] [8 inches].
2. Factory- or field-attached frames that fit channel sections and grates.
  - a. Material: Manufacturer's standard metal.
3. Grates with slots or perforations that fit frames.
  - a. Material: [Fiberglass] [Galvanized steel] [Gray iron] [Stainless steel].
4. Covers: Solid gray iron, if indicated.
5. Drainage Specialties: Include the following plastic components:
  - a. Large Catch Basins: 24 inch square plastic body, with outlets in number and sizes indicated. Include gray-iron frame and slotted grate.
  - b. Small Catch Basins: 12 by 24 inch plastic body, with outlets in number and sizes indicated. Include gray-iron frame and slotted grate.

- D. PE Systems: Include the following components:

1. Channel Sections: Interlocking-joint, PE modular units, 4 inches wide, with end caps. Include rounded bottom, with level invert and with outlets in number, sizes, and locations indicated.
2. Grates: PE, ladder shaped; with stainless-steel screws.
3. Color: Gray, unless otherwise indicated.

4. Drainage Specialties: Include the following PE components:
  - a. Drains: 4-inch diameter, round, slotted top; with NPS 4 bottom outlet.
  - b. Drains: 8-inch diameter, round, slotted top; with NPS 6 bottom outlet.
  - c. Drains: 4-inch square, slotted top; with NPS 3 bottom outlet.
  - d. Drains: 8-inch square, slotted top; with NPS 6 bottom outlet.
  - e. Catch Basins: 12-inch square plastic body, with outlets in number and sizes indicated. Include PE slotted grate 11-3/4 inches square by 1-1/8 inches thick.
- E. Supports, Anchors, and Setting Devices: Manufacturer's standard, unless otherwise indicated.
- F. Channel-Section Joining and Fastening Materials: As recommended by system manufacturer.

## 2.19 CONCRETE DRAINAGE STRUCTURES

- A. Drainage Structure Boxes: Precast reinforced concrete in accordance with Section 719 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
  1. Design: ASTM C 913, designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading.
  2. Configuration: as indicated on South Carolina Department of Transportation Standard Drawing 719-305.
  3. Depth and Size: as indicated on Drawings.
  4. Pipe Openings: as required for pipe size and location.
    - a. Must be integral to design and provided at time of original casting.
    - b. Where possible, orient structure so pipes enter through walls. Pipes may enter through corners provided a minimum of 6" wall space is provided to top and other openings.
  5. Risers: Precast reinforced concrete as indicated on South Carolina Department of Transportation Standard Drawing 719-315.
  6. Steps: Individual ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12 to 16-inch intervals. Omit steps if total depth from floor of box to finished grade is less than 54 inches.
  7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  8. Mortar and Grout: Comply with ASTM C 270, Type M or S.
- B. Catch Basins: Conforming to Section 719 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.



1. Transitional Top Slabs (where required): At a minimum, as indicated on South Carolina Department of Transportation Standard Drawing 719-330 with additional reinforcing as required for opening.
  2. Frames and Grates: as indicated on Drawings or as required by agency having authority.
    - a. Cast Iron: conforming to AASHTO M 105, Class 35B.
    - b. Steel Tubing: conforming to ASTM A 53, Schedule 80.
    - c. All finished frames and grates shall conform to the alternate load test of AASHTO M 306.
- C. Junction Boxes: Conforming to Section 719 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Top Slabs: At a minimum, as indicated on South Carolina Department of Transportation Standard Drawing 719-330 with additional reinforcing as required for opening.
  2. Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange and 26-inch diameter cover. Include indented top design with lettering cast into cover, using wording or design required by agency having authority. Where no specific wording or design is required by agency, wording equivalent to "STORM SEWER" shall be cast.
    - a. Material: ASTM A 48, Class 35 gray iron, unless otherwise indicated.
    - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise noted.
- D. Curb Inlets: Conforming with Section 719 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Top Slabs and Throats: As indicated on Drawings and conforming to South Carolina Department of Transportation Standard Drawings 719-016, 719-017, and 719-018 as applicable.
  2. Throat Transitions to Curb: Cast-in-place concrete, hand formed to provide smooth transition to adjoining curb. Finish to match adjoining curb.
  3. Frames and Covers: Ferrous; 24 inch ID. Frame designed to be embedded in concrete with top flush to concrete surface. 2-1/2 inch minimum width flange and 24 inch diameter cover. Include indented top design with lettering cast into cover, using wording or design required by agency having authority. Where no specific wording or design is required by agency, wording equivalent to "STORM SEWER" shall be cast.
    - a. Material: ASTM A 48, Class 35 gray iron, unless otherwise indicated.
    - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise noted.

- E. Gutter Inlets: Conforming to Section 719 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Transitional Top Slabs (where required): At a minimum, as indicated on South Carolina Department of Transportation Standard Drawing 719-330 with additional reinforcing as required for opening.
  2. Frames and Grates: as indicated on Drawings or as required by agency having authority.
    - a. Cast Iron: conforming to AASHTO M 105, Class 35B.
    - b. Steel Tubing: conforming to ASTM A 53, Schedule 80.
    - c. All finished frames and grates shall conform to the alternate load test of AASHTO M 306.
- F. Weir Inlets: Conforming to Section 719 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Top Slabs: At a minimum, as indicated on South Carolina Department of Transportation Standard Drawing 719-330 with additional reinforcing as required for opening.
  2. Frames and Covers: Ferrous; 24 inch ID. Frame designed to be embedded in concrete with top flush to concrete surface. 2-1/2 inch minimum width flange and 24 inch diameter cover. Include indented top design with lettering cast into cover, using wording or design required by agency having authority. Where no specific wording or design is required by agency, wording equivalent to "STORM SEWER" shall be cast.
    - a. Material: ASTM A 48, Class 35 gray iron, unless otherwise indicated.
    - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise noted.
- G. Pond Outlet Structures: Conforming to Section 719 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Top Slabs (where indicated): At a minimum, as indicated on South Carolina Department of Transportation Standard Drawing 719-330 with additional reinforcing as required for opening.
  2. Frames and Covers (where indicated): Ferrous; 24 inch ID. Frame designed to be embedded in concrete with top flush to concrete surface. 2-1/2 inch minimum width flange and 24 inch diameter cover. Include indented top design with lettering cast into cover, using wording or design required by agency having authority. Where no specific wording or design is required by agency, wording equivalent to "STORM SEWER" shall be cast.
    - a. Material: ASTM A 48, Class 35 gray iron, unless otherwise indicated.
    - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise noted.

3. Frames and Grates (where indicated): as indicated on Drawings or as required by agency having authority.
  - a. Cast Iron: conforming to AASHTO M 105, Class 35B.
  - b. Steel Tubing: conforming to ASTM A 53, Schedule 80.
  - c. Plastic: HDPE
4. Fastenings: Stainless steel, as recommended by manufacturer.

## 2.20 PVC DRAINAGE STRUCTURES

- A. Drain Basins: Nyloplast type or approved equal, manufactured from PVC pipe stock meeting the requirements of ASTM D 3034. Fabrication shall utilize a thermo-molding process to reform the pipe stock to the required configuration. The pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the indicated pipe material. Finished joint system shall meet the requirements of ASTM D 3212.
  1. Grates: Ductile Iron meeting the requirements or ASTM A 536, Grade 70-50-05.
    - a. Furnished by the same manufacturer as part of an integral system.
    - b. Shall be capable of supporting ASSHTO H-25 loading.
    - c. Protective Coating: Foundry-applied black paint.
  2. Manufacturers:
    - a. Advanced Drainage Systems, Inc.
    - b. Hancor, Inc.
- B. Inline Drains: Nyloplast type or approved equal, manufactured from PVC pipe stock meeting the requirements of ASTM D 3034. Fabrication shall utilize a thermo-molding process to reform the pipe stock to the required configuration. The pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the indicated pipe material. Finished joint system shall meet the requirements of ASTM D 3212.
  1. Grates: Ductile Iron meeting the requirements or ASTM A 536, Grade 70-50-05.
  2. ade 70-50-05.
    - a. Furnished by the same manufacturer as part of an integral system.
    - b. Shall be capable of supporting ASSHTO H-25 loading.
    - c. Protective Coating: Foundry-applied black paint.
  3. Manufacturers:
    - a. Advanced Drainage Systems, Inc.
    - b. Hancor, Inc.

## 2.21 PIPE INLETS AND OUTLETS

- A. Head Walls: [Cast-in-place][Precast] reinforced concrete, with apron and tapered sides.
- B. Riprap: Broken, irregular size and shape, graded stone conforming to Section 804 of the South Carolina Department of Transportation Standard Specifications for Highway Construction
  - 1. Gradation: Class B.
- C. Turf Reinforcement Mat: Three dimensional, woven, highly UV resistant, polypropylene geotextile specifically designed for erosion control applications on steep slope and high velocity, vegetated waterway applications. Conforming to FHWA FP-03, Section 713.18. Include manufacturer's recommended installation anchor materials.
  - 1. Manufacturers:
    - a. Propex Geosynthetics: (Pyramat)
    - b. North American Green: (P550)
    - c. American Excelsior Co.: (Recyclex)

## 2.22 DRY WELLS

- A. Description: ASTM C 913, precast, reinforced, perforated concrete rings. Include the following:
  - 1. Floor: Cast-in-place concrete.
  - 2. Cover: Liftoff-type concrete cover with cast-in lift rings.
  - 3. Wall Thickness: 4 inches minimum with 1 inch diameter or 1 by 3 inch maximum slotted perforations arranged in rows parallel to axis of ring.
    - a. Total Free Area of Perforations: Approximately 15 percent of ring interior surface.
    - b. Ring Construction: Designed to be self-aligning.
  - 4. Filtering Material: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
    - a. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
- B. Description: Manufactured PE side panels and top cover that assemble into 50 gal. storage capacity units.

1. Manufacturers:
  - a. Flo-Well Products, Ltd.
2. Side Panels: With knockout ports for piping and seepage holes.
3. Top Cover: With knockout port for drain.
4. Filtering Material: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
  - a. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.

## 2.23 STORMWATER DISPOSAL SYSTEMS

### A. Chamber Systems:

1. Manufacturers:
  - a. Advanced Drainage Systems, Inc.
  - b. StormTech, LLC
  - c. Cultec, Inc.
  - d. Hancor, Inc.
  - e. Infiltrator Systems, Inc.
  - f. R-Tank by ACF Environmental.
2. Storage and Leaching Chambers: Molded PE or PP with open cellular structures or arched structures with perforated sides and open bottom. Include number of chambers, distribution piping, end plates, and other standard components as required for system total capacity.
3. Filtering Material: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
4. ons for Highway Construction.
  - a. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
5. Filter Mat: as recommended by manufacturer.

### B. Pipe Systems: Perforated manifold, header, and lateral piping complying with AASHTO M 252M for NPS 10 and smaller, AASHTO M 294M for NPS 12 to NPS 48, and AASHTO MP7 for NPS 54 and NPS 60. Include proprietary fittings, couplings, seals, and filter fabric.

1. Manufacturers:

- a. Advanced Drainage Systems, Inc.
  - b. Hancor, Inc.
2. Filtering Material: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- a. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
3. Filter Mat: as recommended by manufacturer.

## 2.24 STORMWATER OIL AND SEDIMENT SEPARATORS

- A. Description: ASTM C 478 or ASTM C 913 as applicable. Precast, reinforced, concrete structures, with provision for sealant joints. Installed unit shall be capable of bearing an AASHTO HS 20 traffic loading.
1. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  2. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
  3. Internal components: Shall be of by the same manufacturer and of integral design to the complete system. Shall be of durable materials and shall not require cleaning or replacement as part of routine maintenance. System shall be of a design that provides for removal of accumulated oil and sediment by a self-contained vacuum truck of the type typically used for stormwater and sanitary sewer line cleaning.
  4. Manhole Frames and Covers: Ferrous; 24 inch ID by 7 to 9 inch riser with 4 inch minimum width flange and 26 inch diameter cover. Include indented top design with lettering cast into cover, using wording or design required by agency having authority. Where no specific wording or design is required by agency, wording equivalent to "STORM SEWER" shall be cast.
    - a. Material: ASTM A 48, Class 35 gray iron, unless otherwise indicated.
    - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise
  5. Performance: The device shall remove oil and sediment from stormwater to the following standards:
    - a. Free Oil: 95% of the floatable free oil.
    - b. Total Suspended Solids: 80% of the average annual total suspended solids load without scouring previously captured pollutants.
    - c. Capacity: Device shall have sufficient storage capacity to provide for annual pollutant removal without loss of filtration efficiency.

6. Manufacturers:
  - a. Stormceptor, Inc.
  - b. Contech, Inc, (Vortech)
  - c. CDS Technologies, Inc.
  - d. First Defense by Hydro International, Inc.

## PART 3 - EXECUTION

### 3.1 SCDOT JURISDICTION

- A. For drainage pipe culverts located within areas of SCDOT jurisdiction, installation shall be in accordance with Supplementary Technical Specification SC-M-714 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

### 3.2 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Section titled "Earth Moving."
- B. Protect and maintain erosion and sedimentation controls, which are specified in Section titled "Site Clearing," during earthwork operations.

### 3.3 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. I gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- D. Install manholes or drainage structures for changes in direction unless fittings are indicated. Use manholes or drainage structures for branch connections unless direct connection into existing sewer is indicated.

- E. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- F. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.
- G. Install gravity-flow, nonpressure drainage piping according to the following as applicable:
  - 1. Install piping pitched down in direction of flow, at minimum slope of 0.20 percent, unless otherwise indicated.
  - 2. Install piping below frost line.
  - 3. Install ductile-iron culvert piping according to ASTM A 716.
  - 4. Install ductile-iron and special fittings according to AWWA C600 or AWWA M41.
  - 5. Install corrugated steel piping according to ASTM A 798/A 798M.
  - 6. Install HDPE corrugated sewer piping according to CPPA's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."
  - 7. Install PP sewer piping in accordance with ASTM D 2321 and manufacturer's written instructions.
  - 8. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
  - 9. Install reinforced-concrete sewer piping, elliptical concrete pipe, and concrete box culverts according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
- H. Where applicable, install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:
  - 1. Ductile-iron pipe and fittings.
  - 2. Special pipe fittings.

### 3.4 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure drainage piping according to the following as applicable:
  - 1. Join ductile-iron culvert piping according to AWWA C600 for push-on joints.
  - 2. Join ductile-iron and special fittings according to AWWA C600 or AWWA M41.
  - 3. Join corrugated steel sewer piping according to ASTM A 798/A 798M.
  - 4. Join corrugated HDPE piping according to CPPA 100 and the following:
    - a. Use silttight couplings for Type 2, silttight joints.
    - b. Use watertight couplings for Type 3, watertight joints.
  - 5. Join PP sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric gasket joints.
  - 6. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric gasket joints.



7. Join reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual" for rubber-gasket, bitumen, or butyl-rubber sealant joints as applicable.
8. Join dissimilar pipe materials with nonpressure-type flexible couplings.

- B. Wrap pipe joints with pipe joint wrap geotextile at least 18 inches in width. For larger pipe diameters where an 18 inch width is insufficient to completely cover the pipe bell, use a width sufficient to cover and extend beyond the bell at least 6 inches.

### 3.5 BACKWATER VALVE INSTALLATION

- A. Install horizontal-type backwater valves in piping where indicated.
- B. Install combination horizontal and manual gate valve type in piping and in manholes where indicated.
- C. Install terminal-type backwater valves on end of piping and in manholes where indicated.

### 3.6 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use pipe fittings of same material as pipe at branches for cleanouts and PVC pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
- B. Install cast-iron frames and covers.
  1. Use medium-duty, top-loading classification cleanouts in landscaped and foot-traffic areas.
  2. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
  3. Use extra-heavy-duty, top-loading classification cleanouts in roads areas.
  4. Set cleanout frames and covers located in earthen areas in cast-in-place concrete collar, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade
  5. Set cleanout frames and covers in pavement with tops flush with pavement surface.

### 3.7 DRAIN INSTALLATION

- A. Install type of drains in locations indicated.
  1. Use medium-duty, top-loading classification drains in landscaped or foot-traffic areas.
  2. Use heavy-duty, top-loading classification drains in vehicle-traffic service areas.
  3. Use extra-heavy-duty, top-loading classification drains in roads areas.

- B. Embed drains in 4-inch minimum depth of concrete around bottom and sides.
- C. Fasten grates to drains if indicated.
- D. Set drain frames and covers with tops flush with pavement surface.
- E. Assemble trench sections with flanged joints.
- F. Embed trench sections in 4-inch minimum concrete around bottom and sides.

### 3.8 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections according to ASTM C 891.
- C. For manholes that occur in pavements, set tops of frames and covers flush with finished surface. Set tops 2 inches above finished surface elsewhere, unless otherwise indicated.

### 3.9 CONCRETE DRAINAGE STRUCTURE INSTALLATION

- A. General: Install drainage structures, complete with appurtenances and accessories indicated.
- B. Install precast concrete drainage structure sections according to ASTM C 891.
- C. Set tops, frames, grates and covers to elevations indicated.
- D. Fabricate inlet throats to shape and elevations indicated.
- E. Seal and grout all opening around pipe penetrations watertight.

### 3.10 PVC DRAINAGE STRUCTURE INSTALLATION

- A. Install manufactured, PVC drainage structures, complete with appurtenances and accessories indicated, according to manufacturer's written instructions and the following:
  - 1. Install PVC drainage structures according to ASTM D 2321 and ASTM F 1668.
  - 2. Join piping to structure according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric gasket joints.
  - 3. Finished joint system shall meet the requirements of ASTM D 3212.
- B. Set frames, grates and covers to elevations indicated.

### 3.11 PIPE INLET AND OUTLET INSTALLATION

- A. Construct inlet and outlet head walls, aprons, and sides of reinforced concrete, as indicated.
  - 1. Comply with the requirements of Sections 701, and 702 of the South Carolina Department of Transportation Standard Specifications for Highway Construction for measuring, mixing, transporting, and placing concrete.
- B. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.
- C. Construct riprap of broken stone, as indicated.
- D. Install turf reinforcement mat as indicated and in accordance with manufacturer's written instructions.

### 3.12 DRY WELL INSTALLATION

- A. Excavate hole to diameter of at least 6 inches greater than outside of dry well. Do not extend excavation into ground-water table.
- B. Install precast, concrete-ring dry wells according to the following:
  - 1. Assemble rings to depth indicated.
  - 2. Extend rings to height where top of cover will be approximately 8 inches below finished grade.
  - 3. Backfill bottom of inside of rings with filtering material to level at least 12 inches above bottom.
  - 4. Extend effluent inlet pipe 12 inches into rings and terminate into side of tee fitting.
  - 5. Backfill around outside of rings with filtering material to top level of rings.
  - 6. Install cover over top of rings.
- C. Install manufactured, PE dry wells according to manufacturer's written instructions and the following:
  - 1. Assemble and install panels and cover.
  - 2. Backfill bottom of inside of unit with filtering material to level at least 12 inches above bottom.
  - 3. Extend effluent inlet pipe 12 inches into unit and terminate into side of tee fitting.
  - 4. Install filter fabric around outside of unit.
  - 5. Install filtering material around outside of unit.

### 3.13 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to Sections 701, and 702 of the South Carolina Department of Transportation Standard Specifications for Highway Construction for measuring, mixing, transporting, and placing concrete.

### 3.14 CHANNEL DRAINAGE SYSTEM INSTALLATION

- A. Assemble and install components according to manufacturer's written instructions.
- B. Install with top surfaces of components, except piping, flush with finished surface.
- C. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.
- D. Embed channel sections and drainage specialties in 4 inch minimum concrete around bottom and sides.
- E. Fasten grates to channel sections if indicated.

### 3.15 STORMWATER DISPOSAL SYSTEM INSTALLATION

- A. Chamber Systems: Excavate trenches of width and depth, and install system and backfill according to chamber manufacturer's written instructions. Include storage and leaching chambers, filtering material, and filter mat.
- B. Piping Systems: Excavate trenches of width and depth, and install piping system, filter fabric, and backfill according to piping manufacturer's written instructions.

### 3.16 STORMWATER OIL AND SEDIMENT SEPARATOR INSTALLATION

- A. General: Install stormwater oil and sediment separators, complete with appurtenances and accessories indicated.
- B. Install separators according to manufacturer's written instructions
- C. Install precast concrete sections according to ASTM C 891.
- D. For separators that occur in pavements, set tops of frames and covers flush with finished surface. Set tops 2 inches above finished surface elsewhere, unless otherwise indicated.

### 3.17 PLUGGING STORM DRAINAGE SYSTEM STUB-OUTS FOR FUTURE EXPANSION

- A. Close open ends of underground piping indicated as stub-outs for future expansion. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of piping have been closed. Use procedure below:
  - 1. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Backfill to grade according to Section titled "Earth Moving."

### 3.18 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
  - 1. Close open ends of piping with at least 8-inch thick, brick masonry bulkheads.
  - 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:
  - 1. Remove manhole or structure and close open ends of remaining piping.
  - 2. Remove top of manhole or structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
- C. Backfill to grade according to Section titled "Earth Moving."

### 3.19 IDENTIFICATION

- A. Materials and their installation are specified in Section titled "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
  - 1. Use detectable warning tape over piping and over edges of underground structures.

### 3.20 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
  - 1. Submit separate reports for each system inspection.
  - 2. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 95 percent of piping diameter.
    - c. Crushed, broken, cracked, or otherwise damaged piping.
    - d. Infiltration: Water leakage into piping.
    - e. Exfiltration: Water leakage from or around piping.
  - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  - 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
  - 1. Do not enclose, cover, or put into service before inspection and approval.
  - 2. Test completed piping systems according to authorities having jurisdiction.
  - 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
  - 4. Submit separate report for each test.
  - 5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
    - a. Test plastic piping according to ASTM F 1417.
    - b. Test concrete piping according to ASTM C 924.
- C. Leaks and loss in test pressure, if applicable, constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.
- E. Video Documentation: Upon completion and prior to final inspection, complete a videotaped documentation of the completed piping system, along its interior length, utilizing equipment made expressly for the purpose. Provide a written report, inspection logs, and a copy of the inspection videotape to the Architect.

3.21 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Collect flushed materials in sediment trapping devices: do not flush into downstream drainage systems or receiving waterbodies.

END OF SECTION 334100

## SECTION 329200 - TURF AND GRASSES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Seeding.
  - 2. Sodding.
  - 3. Planting soil and amendments.
  - 4. Maintenance.

#### 1.3 SUBMITTALS

- A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
  - 1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.
- B. Material Test Reports: Soil analysis report for existing in-place surface soil.
- C. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.
- D. Sod Installation Schedule: Provide schedule of installation dates for sod. Do not install dormant sod without prior approval of Architect.
- E. Minutes of preinstallation conference.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and



capability to conduct the testing indicated and that specializes in types of tests to be performed.

- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
- D. Preinstallation Conference: Conduct conference at Project site.
- E. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
  - 1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.
- C. Bulk Materials:
  - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
  - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
  - 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

#### 1.6 PROJECT CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade, base course, or setting beds.
- B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.

1. Spring Planting: January 1 – June 30
2. Fall Planting: July 1 – December 31

- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

## 1.7 MAINTENANCE SERVICE

- A. Maintenance Service: Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until Final Completion of project.

## PART 2 - PRODUCTS

### 2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: State-certified seed of grass species as follows:
1. Seed: Provide seed mix, for the project location and planting date, as defined by the Seeding Schedules for Permanent Vegetation in Section 810 of the SCDOT Standard Specifications for Highway Construction.
  2. Seed: as indicated on Plant Schedule.

### 2.2 TURFGRASS SOD

- A. Turfgrass Sod: Certified Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.
1. Turfgrass Species: as indicated on Plant Schedule.
  2. Sod shall be delivered to the project site within twenty four (24) hours after harvest at the nursery, and shall be sheltered from the sun and wind until planted by the Contractor.
  3. Contractor shall lay sod within thirty six (36) hours after harvest. Sod shall not be laid where the roots have dried due to exposure from the sun and wind, or has thinned for these or other reasons.

## 2.3 INORGANIC SOIL AMENDMENTS

- A. Provide inorganic soil amendments in quantities and proportions recommended by soil analysis report.

## 2.4 ORGANIC SOIL AMENDMENTS

- A. Provide organic soil amendments in quantities and proportions recommended by soil analysis report.

## 2.5 FERTILIZERS

- A. Provide fertilizers in quantities and proportions recommended by soil analysis report.
- B. At Contractor's option, provide one or more of the following planting soils. All soils used for planting shall be prepared as necessary using soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce satisfactory planting soil suitable for healthy, viable plants.
  - 1. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil with soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce planting soil.
  - 2. Planting Soil: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
    - a. Supplement with another specified planting soil when quantities are insufficient.
    - b. Mix existing, native surface topsoil with soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce planting soil.
  - 3. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce planting soil.
  - 4. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs, or marshes.
    - a. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of

roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

- b. Mix imported topsoil or manufactured topsoil with soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce planting soil.

## 2.6 MULCHES

- A. Fiber Mulch: Biodegradable, non-dyed wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

## 2.7 PESTICIDES AND HERBICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

## 2.8 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets (ECB): Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended staples, 6 inches long.
  1. Products: Subject to compliance with requirements and approval of Architect.

- B. Flexible Growth Medium: Long-term biodegradable, hydraulically applied, high loft, flexible erosion control blanket composed of long strand, thermally processed wood fibers, synthetic fibers and an organic, hydro-colloid tackifier. Material shall require no cure time to reach full effectiveness.
  - 1. Products: Subject to compliance with requirements and approval of Architect..

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
  - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
  - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
  - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

### 3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
  - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
  - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

### 3.3 TURF AREA PREPARATION

- A. Limit turf subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
  - 1. Apply fertilizer directly to subgrade before loosening.
  - 2. Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
    - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
    - b. Mix lime with dry soil before mixing fertilizer.
  - 3. Spread planting soil to the depth indicated or to a min. depth of 8 inches, but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
    - a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
    - b. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
  - 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
  - 2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
    - a. Apply fertilizer directly to surface soil before loosening.
  - 3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
  - 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

- F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

### 3.4 TURF REINFORCEMENT MAT (TRM)

- A. Prepare area as specified in "Turf Area Preparation" Article.
- B. For turf reinforcement mat, install planting soil in two lifts, with second lift equal to thickness and on top of the mat.
- C. Install mat and fasten as instructed by material manufacturer.
- D. Fill cells of turf reinforcement mat with planting soil and compact before planting.
- E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

### 3.5 SODDING

- A. Lay sod within 36 hours of harvesting. Do not lay sod if ground is frozen or muddy.
  - 1. Do not lay dormant sod without prior approval of Architect.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
  - 1. Lay sod across angle of slopes exceeding 1:3.
  - 2. Anchor sod on slopes exceeding 1:4 with staples spaced as instructed by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

### 3.6 TURF MAINTENANCE (SEED AND SOD)

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
- B. Watering

1. Acceptable Watering Methods:
    - a. Water Truck
    - b. Irrigation
    - c. Other methods as approved by Owner
  2. Keep turf (seed and sod) sufficiently watered throughout the maintenance period through the completion of the warranty period.
  3. Contractor to create a temporary watering schedule for turf establishment (seed, sprigs and sod), if there is no irrigation installed.
  4. If irrigation is installed, plans for utilization of in-ground irrigation systems shall be submitted for approval prior to use..
  5. Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources to keep turf uniformly moist to a depth of 4 inches.
  6. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
  7. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.
- C. Mowing: Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
1. Mow bermudagrass to a height of 1/2 to 1 inch.
  2. Mow carpetgrass, centipedegrass, perennial ryegrass, and zoysiagrass to a height of 1 to 2 inches.
  3. Mow Kentucky bluegrass, buffalograss, annual ryegrass, chewings, and red fescue to a height of 1-1/2 to 2 inches.
  4. Mow bahiagrass, turf-type tall fescue, and St. Augustinegrass to a height of 2 to 3 inches.
- D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.
- 3.7 SATISFACTORY TURF
- A. Turf installations shall meet the following criteria as determined by Architect:
1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities.



2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
  3. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

### 3.8 PESTICIDE AND HERBICIDE APPLICATION

- A. Do not use pesticides or herbicides.
- B. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written instructions. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

### 3.9 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
1. Unless otherwise instructed, do not permit traffic on grass paving areas until turf is established:
    - a. For a minimum of 8 weeks on seeded grass pavements.
    - b. For a minimum of 4 weeks on sodded grass pavements.
- C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200

## SECTION 328400 – IRRIGATION SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Underground irrigation system with piping, valves, heads, water source, pump, control equipment, and other items as indicated on the drawings.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Irrigation system shall be installed in accordance with the plans, details and notes prepared by Irrigation Consultant.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Qualification Data: For qualified Installer.
- C. Field quality-control reports.
- D. Record Drawings: Include the following, as required by authorities having jurisdiction, for use by surveyor in preparing record drawings:
  - 1. Designation, size and length of irrigation pipe.
  - 2. Designation and location of irrigation zones.
  - 3. Designation and location of irrigation sprinkler type.
- E. Operation and Maintenance Data: For sprinklers, controllers and automatic control valves to include in operation and maintenance manuals.
- F. Minutes of preinstallation conference.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed projects of similar design and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for irrigation system shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

PART 2 - **PRODUCTS** (SUBMIT SHOP DRAWINGS FOR REVIEW)

PART 3 - **EXECUTION** (SUBMIT SHOP DRAWINGS FOR REVIEW)

END OF SECTION 328400

## SECTION 311000 - SITE CLEARING AND EROSION CONTROL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Protecting existing vegetation to remain.
  - 2. Removing existing vegetation.
  - 3. Clearing and grubbing.
  - 4. Stripping and stockpiling topsoil.
  - 5. Removing above- and below-grade site improvements.
  - 6. Disconnecting, capping or sealing, and removing site utilities.
  - 7. Temporary erosion and sedimentation control measures.

#### 1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

#### 1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil to be stockpiled on site or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

## 1.5 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings, according to Division 01 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.
- C. Minutes of preinstallation conference.

## 1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
- B. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
  - 1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.

## 1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
  - 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing. Do not proceed with operations until existing utilities are located and clearly marked.

- E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.
- F. Suspend clearing operations during wet conditions unless otherwise directed by Architect.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
  - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

### 2.2 EROSION CONTROL MATERIALS

- A. Silt Fence Geotextile: Woven geotextile fabric, manufactured for silt fence applications, made from polyolefins or polyesters; with elongation less than 20 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
  - 1. Grab Tensile Strength: 100 lbf; ASTM D 4632.
  - 2. Permittivity: 0.05 per second, minimum; ASTM D 4491.
  - 3. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.
- B. Silt Fence Post: Steel, either integrally manufactured with the silt fence as part of a complete system or separately provided. Where separately provided, the following shall apply:
  - 1. Steel posts: T or U cross-sectional shape. Minimum weight 1.3 pounds per foot. Minimum length 5 feet. Shall have projections to aid in fastening wire of fabric. Shall have a metal plate welded near the bottom such that, when driven to proper depth, it will be below ground and will aid stability.
  - 2. Fasteners: Galvanized wire or other fasteners as required for a secure installation.
  - 3. Maximum Spacing: 6 feet on center.
- C. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

D. hods referenced:

1. Survivability: Class 2; SCDOT Standard Specs
2. Grab Tensile Strength: 200 lbf; ASTM D 4632.
3. Sewn Seam Strength: 180 lbf; ASTM D 4632.
4. Puncture Strength: 80 lbf; ASTM D 4833.
5. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
6. Permittivity: 0.1 per second, minimum; ASTM D 4491.
7. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

E. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

F. er than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 1; SCDOT Standard Specs
2. Grab Tensile Strength: 90 lbf; ASTM D 4632.
3. Sewn Seam Strength: 80 lbf; ASTM D 4632.
4. Puncture Strength: 40 lbf; ASTM D 4833.
5. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
6. Permittivity: 0.2 per second, minimum; ASTM D 4491.
7. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

G. Woven Wire Fabric: ASTM A 116, Class1, wire and opening sizes as indicated.

H. Erosion Control Aggregate: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements indicated on the Drawings and the material requirements of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

1. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.

I. Riprap: Broken, irregular size and shape, graded stone conforming to Section 804 of the South Carolina Department of Transportation Standard Specifications for Highway Construction

1. Gradation: Class B.

## 2.3 TREE PROTECTION MATERIALS

A. Fence Material: As indicated. Orange polypropylene safety mesh, as indicated. Minimum weight 16 lbs per 4 foot x 100 foot roll.

- B. Metal Posts and Rails: As indicated. Round cold-formed, electric-resistance-welded, steel pipe or tubing, with minimum yield strength of 45,000 psi and with outside dimension, minimum wall thickness, and weight complying with ASTM F 761 for the following fence height and strength and stiffness requirements:
  - 1. Fence Height: 4 feet.
  - 2. Duty Rating: Medium.
  - 3. Tube or Pipe Diameter and Thickness: According to ASTM F 761.
- C. Wood Posts and Rails: As indicated. 2 inch x 4 inch framing lumber. Minimum post length 6 feet.
- D. PVC Rails: As indicated. 1" diameter Schedule 40 with solvent cement joints.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

#### 3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to a Stormwater Pollution Prevention Plan (SWPPP), specific to the site, that complies with EPA 832/R-92-005 or the requirements of authorities having jurisdiction, whichever is more stringent.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- C. When directed by Architect, remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.



### 3.3 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
  - 1. Do not store construction materials, debris, or excavated material within fenced area.
  - 2. Do not permit vehicles, equipment, or foot traffic within fenced area.
  - 3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
  - 1. Cover exposed roots with burlap and water regularly.
  - 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
  - 3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
  - 4. Backfill with soil as soon as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.
  - 1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
  - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Architect.

### 3.4 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
  - 1. Arrange with utility companies to shut off indicated utilities.
  - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Owner, Architect and operating utility not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without the permission of all of the parties noted above.

- C. Excavate for and remove underground utilities indicated to be removed.
- D. Fill depressions caused by utility removal operations with satisfactory soil material unless further excavation or earthwork is indicated and is to be performed immediately. Do not leave depressions overnight.
  - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

### 3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
  - 3. Completely remove stumps and roots greater than 1" in diameter, obstructions, and debris extending to a depth of 24 inches below exposed subgrade.
  - 4. Use only hand methods for grubbing within tree protection zone.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated and is to be performed immediately. Do not leave depressions overnight.
  - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

### 3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
  - 1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
- C. Dispose of topsoil as specified for surplus soil material in disposal article below.
- D. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Limit height of topsoil stockpiles to 10 feet..
  - 2. Do not stockpile topsoil within tree protection zones.

3. Dispose of excess topsoil as specified for surplus soil material in disposal article below.

### 3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
  1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
  2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

### 3.8 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
  1. Do not burn or chip demolished or waste materials on Owner's property.
  2. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.
- B. Disposal: Remove surplus soil material, and unsuitable topsoil. Remove or burn obstructions, demolished materials, and waste materials including trash and debris.
  1. Legally dispose of removed materials off Owner's property.
  2. All burning and chipping operations shall be legally conducted so as to not adversely affect the project schedule.
  3. Burning or chipping operations shall not be undertaken where noise is likely to disturb adjacent occupants and shall be suspended if complaints are received.
  4. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.
- C. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property. Chip cleared vegetation and stockpile for reuse.
  1. Limit height of chipped material stockpiles to 10 feet..
  2. Do not stockpile chipped material within tree protection zones.
  3. Legally dispose of excess chipped material off Owner's property.
  4. Chipping operations shall be legally conducted so as to not adversely affect the project schedule.
  5. Chipping operations shall be suspended if complaints from adjacent occupants are received. Upon suspension request instructions from Architect.

6. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 311000

## SECTION 321410 – ADA DETECTABLE WARNING PAVERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. ADA detectable warning pavers set in mortar setting beds.

#### 1.3 SUBMITTALS

- A. Product Data: For materials other than water and aggregates.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified unit paving installer meeting the following qualifications.
  - 1. Experience: Five years' experience in unit paving installation in addition to requirements in Division 01 Section "Quality Requirements."
  - 2. Installer's Field Supervision: Installer shall maintain supervisor on Project site full-time when work is in progress.
- B. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.
- C. Regulatory Requirements: Comply with the requirements of the Americans with Disabilities Act and related regulations and guidelines.
- D. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
  - 1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store liquids in tightly closed containers protected from freezing.

## 1.6 PROJECT CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- B. Weather Limitations for Mortar:
  - 1. Cold-Weather Requirements: Protect unit paver work against freezing when ambient temperature is 40 deg F and falling. Heat materials to provide mortar temperatures between 40 and 120 deg F. Provide the following protection for completed portions of work for 24 hours after installation when the mean daily air temperature is as indicated: below 40 deg F, cover with weather-resistant membrane; below 25 deg F, cover with insulating blankets; below 20 deg F, provide enclosure and temporary heat to maintain temperature above 32 deg F.
  - 2. Hot-Weather Requirements: Protect unit paver work when temperature and humidity conditions produce excessive evaporation of setting beds. Provide artificial shade and windbreaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and higher.
    - a. When ambient temperature exceeds 100 deg F, or when wind velocity exceeds 8 mph and ambient temperature exceeds 90 deg F, set pavers within 1 minute of spreading setting-bed mortar.

## PART 2 - PRODUCTS

### 2.1 ADA DETECTABLE WARNING PAVERS

- A. ADA Detectable Warning Concrete Pavers: Solid interlocking paving units complying with ASTM C 936 and resistant to freezing and thawing when tested according to ASTM C 67, made from normal-weight aggregates.
  - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. ADA Detectable Warning Pavers by ECG (Elizabeth City Glass), Inc. (These pavers are approved by SCDOT and therefore must be used for all work within an SCDOT R/W).
  - b. Hanover Detectable Warning Pavers by Hanover Architectural Products
  - c. Detectable Warning Pavers by Tile Tech Industries.
  - d. ADA Detectable Warning Pavers by Pavestone Company.
2. Surface Texture: Non-slip, truncated dome surface texture meeting the requirements of the Americans with Disabilities Act (ADA).
  3. Thickness: From 1" to 4" depending on manufacturer.
  4. Face Size and Shape: Square or rectangular, depending on manufacture with no dimension larger than 11-3/4".
  5. Color: As selected by Architect from manufacturer's full range.
- B. ADA Detectable Warning Brick Pavers: Solid brick paving units complying with ASTM C 902. Brick shall be rated "not effloresced" when tested according to ASTM C 67. Provide brick without frogs or cores in surfaces exposed to view in the completed Work.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ADA Detectable Warning Pavers by Pinehall Brick
    - b. ADA Detectable Warning Pavers by Whitacre Greer.
    - c. ADA Detectable Warning Pavers by Endicott Clay Products.
  2. Surface Texture: Non-slip, truncated dome surface texture meeting the requirements of the Americans with Disabilities Act (ADA).
  3. Thickness: Approximately 2-1/4", depending on manufacturer.
  4. Face Size and Shape: Approximately 4" x 8" Rectangular, depending on manufacture.
  5. Color: As selected by Architect from manufacturer's full range.

## 2.2 MORTAR SETTING-BED MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II.
- B. Sand: ASTM C 144.
- C. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement mortar bed, and not containing a retarder.
  1. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
    - a. Boiardi Products Corporation.
    - b. Bonsal, W. R. Company.

- c. Bostik Findley Inc.
- d. C-Cure.
- e. Custom Building Products.
- f. DAP Inc.
- g. Jamo Inc.
- h. Laticrete International, Inc.
- i. MAPEI Corp.
- j. SGM.
- k. Summitville Tiles, Inc.
- l. TEC Incorporated; H. B. Fuller Company.

D. Water: Potable.

### 2.3 MORTAR MIXES

- A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce setting-bed and joint materials of uniform quality and with optimum performance characteristics. Discard mortars and grout if they have reached their initial set before being used.
- B. Mortar-Bed Bond Coat: Mix neat cement or cement and sand with latex additive to a creamy consistency.
- C. Latex-Modified, Portland Cement Setting-Bed Mortar: Proportion and mix portland cement, sand, and latex additive for setting bed to comply with written instructions of latex-additive manufacturer and as necessary to produce stiff mixture with a moist surface when bed is ready to receive pavers.
- D. Latex-Modified, Portland Cement Slurry Bond Coat: Proportion and mix portland cement, sand, and latex additive for slurry bond coat to comply with written instructions of latex-additive manufacturer.

### 2.4 AGGREGATE MATERIALS

- A. All sand and aggregate materials shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
- B. Sand for Joints: Natural or manufactured sand in accordance with the gradation requirements for Fine Aggregate FA-10 (natural) or FA-10M (manufactured) as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
  - 1. Provide sand of color needed to produce required joint color.



## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove substances from concrete substrates that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.
- B. Clean concrete substrates to remove dirt, dust, debris, and loose particles.
- C. Confirm that job-built concrete edge restraints comply with requirements in Division 32 Section "Concrete Paving."

### 3.3 INSTALLATION, GENERAL

- A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.
- B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
- D. Joint Pattern: As indicated.
- E. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.

### 3.4 MORTAR SETTING-BED APPLICATIONS

- A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

- B. Apply mortar-bed bond coat over surface of concrete subbase about 15 minutes before placing setting bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.
- C. Apply mortar bed over bond coat immediately after applying bond coat. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.
- D. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Cut back, bevel edge, remove, and discard setting-bed material that has reached initial set before placing pavers.
- A. Wet brick pavers before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- B. Place pavers before initial set of cement occurs. Immediately before placing pavers on setting bed, apply uniform 1/16-inch- thick, slurry bond coat to bed or to back of each paver with a flat trowel.
- C. Tamp pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.
- D. Spaced Joint Widths: Provide 1/8-inch nominal joint width with variations not exceeding plus or minus 1/16 inch.
- E. Do not allow traffic on installed pavers until sand has been swept into joints.
- F. After mortar has fully cured for at least 24 hours, spread dry sand and fill joints. Sweep pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.
- G. Do not allow traffic on installed pavers until sand has been swept into joints.
- H. Repeat joint-filling process 30 days later.

### 3.5 REPAIRING

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

END OF SECTION 321400

## SECTION 333100 – GRAVITY FLOW SANITARY SEWERAGE SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes gravity sanitary sewer piping and related components outside the building.
- B. The Section includes general requirements that will apply to all gravity sanitary sewerage systems. In addition, the operating utility (the authority having jurisdiction) has numerous specific requirements for materials and execution that are too varied to cover in this specification.
  1. Materials and execution requirements that are not covered in this Section shall comply with the requirements of the operating utility.
  2. Materials and execution requirements that are covered, but are in conflict with the requirements of the operating utility, shall comply with the higher quality or more restrictive requirement.
- C. Tap and Impact Fees will be paid directly to the utility by the Owner and payment of said fees shall not be included in the Contractor's scope of services.

#### 1.3 DEFINITIONS

- A. DIP: Ductile iron pipe.
- B. LLDPE: Linear, low-density polyethylene plastic.
- C. NPS: Nominal pipe size.
- D. PP: Polypropylene plastic.
- E. PVC: Polyvinyl chloride plastic.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Ductile iron pipe.
  - 2. Polyvinyl chloride pipe.
  - 3. Wyes, elbows, reducers and similar fittings.
  - 4. Precast concrete manholes, frame and covers, and related components.
  - 5. Cleanout caps and covers.
  - 6. Nonpressure-type pipe couplings.
  - 7. Restrained joint type pipe couplings.
  - 8. Grease traps.
  - 9. Special fittings for expansion and deflection.
  - 10. Corrosion-protection piping encasement.
- B. Field quality-control test reports.
- C. Record Drawings: Include the following, as required by authorities having jurisdiction, for use by Owner's surveyor in preparing record drawings:
  - 1. Designation, size and length of sewer lines between manholes or cleanouts.
  - 2. Location and depth below finished grade of service connections to sewer main.
  - 3. Location and elevation of any other below ground appurtenances.
- D. Minutes of preinstallation conference.

#### 1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. Comply with requirements of the authorities having jurisdiction.
  - 2. Comply with standards of operating utility for sanitary sewer-service piping, including materials, installation, and testing.
- B. Preinstallation Conference: Conduct conference to comply with requirements in Division 01 Section "Project Management and Coordination."
  - 1. Review methods and procedures related to sanitary sewerage installation including, but not limited to, the following:
    - a. Review requirements of the operating utility.
    - b. Review site conditions and preparatory work.
    - c. Review requirements for protecting work.
    - d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - e. Review inspection schedule and procedures required to monitor and document quality assurance.

- C. Piping materials shall bear label, stamp, or other markings of specified testing agency.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic materials in direct sunlight. Support to prevent sagging and bending.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes and precast concrete structures, according to manufacturer's written rigging instructions.

#### 1.7 PROJECT CONDITIONS

- A. Interruption of Existing Sanitary Sewer Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sanitary sewer service according to requirements indicated:
  - 1. Notify Architect, Owner, and Utility having jurisdiction no fewer than two days in advance of proposed interruption of service.
  - 2. Do not proceed with interruption of water-distribution service without Architect's written permission.

#### 1.8 COORDINATION

- A. Where required, coordinate connection to existing sewer lines with operating utility.

### PART 2 - PRODUCTS

#### 2.1 STANDARDS OF OPERATING UTILITY

- A. See paragraph 1.2.B above for information regarding materials standards of the operating utility.

#### 2.2 DUCTILE-IRON PIPE AND FITTINGS (DIP)

- A. Push-on-Joint, Ductile-Iron Pipe: ASTM A 746, with push-on-joint bell and plain spigot ends.
  - 1. Gaskets: AWWA C111, rubber. Use only lubricants approved by the manufacturer.
  - 2. Fittings: AWWA C110 or AWWA C153.

3. Pressure class: Class 150 minimum or as required by agency having jurisdiction.
4. Interior Lining: Ceramic Epoxy (Protecto 401 or approved equal), 40 mil thickness.
5. Laying length: 18 feet-0 inches to 20 feet-0 inches.
6. Pipe size: No metric sized pipe shall be permitted.
7. Marking: Clearly mark each joint of pipe at convenient intervals, as follows:
  - a. Manufacturer's name.
  - b. Nominal pipe size.
  - c. Letters "DI" or "Ductile".
  - d. Weight.
  - e. Pressure Class.
8. Products: Subject to compliance with requirements, provide products by one of the following:
  - a. American-Cast Iron Pipe Co.
  - b. Griffin Pipe Co.
  - c. McWane Cast Iron Pipe Co..
  - d. U.S. Pipe Co.

## 2.3 POLYVINYL CHLORIDE PLASTIC PIPE AND FITTINGS (PVC)

- A. PVC Sewer Pipe (ASTM): ASTM D 3034, Class 150, with bell end with gasket, and with spigot end.
  1. Gaskets: ASTM F 477, rubber. Use lubricants approved by the manufacturer.
  2. Fittings: ASTM D 3034. Use of saddle type fittings is prohibited.
  3. Joints: ASTM D 3212.
  4. Laying length: 18 feet-0 inches to 20 feet-0 inches
  5. Pipe size: comply with outside diameter dimensions of DIP.
  6. Standard dimension ratio: SDR 26, unless otherwise indicated on Drawings. SDR 21 where indicated for greater depth and crossings of other utilities (AWWA C900 or DIP may alternately be indicated for these applications).
  7. Pipe color: green.
  8. The use of solvent weld joints is prohibited.
  9. Marking: Clearly mark each joint of pipe at convenient intervals, as follows:
    - a. Manufacturer's name.
    - b. Nominal pipe size.
    - c. Pressure class.
    - d. Material designation.
    - e. National Sanitation Foundation (NSF) seal.
- B. PVC Sewer Pipe (AWWA): AWWA C900, Class 150, with bell end with gasket, and with spigot end.

1. Gaskets: ASTM F 477, rubber. Use only non-toxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
2. Joints: ASTM D 3139.
3. Laying length: 18 feet-0 inches to 20 feet-0 inches
4. Pipe size: comply with outside diameter dimensions of DIP.
5. Standard dimension ratio: SDR 18.
6. Pipe color: green.
7. The use of solvent weld joints is prohibited.
8. Marking: Clearly mark each joint of pipe at convenient intervals, as follows:
  - a. Manufacturer's name.
  - b. Nominal pipe size.
  - c. Pressure class.
  - d. Material designation.

C. National Sanitation Foundation (NSF) seal.

D. PVC Sewer Pipe: AWWA C905, DR-18, with bell end with gasket, and with spigot end.

1. Gaskets: ASTM F 477, rubber. Use lubricants approved by the manufacturer.
2. Fittings: ASTM D 3034. Use of saddle type fittings is prohibited.
3. Joints: AWWA C111
4. Laying length: 18 feet-0 inches to 20 feet-0 inches
5. Pipe size: comply with outside diameter dimensions of DIP.
6. Standard dimension ratio: SDR 18, unless otherwise indicated on Drawings.
7. Pipe color: green.
8. The use of solvent weld joints is prohibited.
9. Marking: Clearly mark each joint of pipe at convenient intervals, as follows:
  - a. Manufacturer's name.
  - b. Nominal pipe size.
  - c. Pressure class.
  - d. Material designation.
  - e. National Sanitation Foundation (NSF) seal.
  - f.

## 2.4 MANHOLES

A. Standard Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.

1. Diameter: 48 inches minimum or as required to accommodate pipe size, unless otherwise indicated.
2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.

3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
  4. Inverts (channels and benches): See "Concrete" article below.
  5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
  6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
  7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
  9. Steps: Individual ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12 to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
  10. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and diameter matching manhole frame and cover. Include sealant recommended by ring manufacturer.
  11. Protective Coating: For interior surfaces of lift station receiving manholes, manholes with force main connections, and the next manhole downstream apply Raven 405 by Raven Lining Systems or approved equal. 120 mil nominal thickness.
  12. Manhole Frames and Covers: Ferrous; 24 inch ID by 7 to 9 inch riser with 4 inch minimum width flange and 26 inch diameter cover. Include indented top design with lettering cast into cover, using wording or design required by agency having authority. Where no specific wording or design is required by agency, wording equivalent to "SANITARY SEWER" shall be cast.
    - a. Material: ASTM A 48, Class 35 gray iron, unless otherwise indicated.
    - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise
- B. Manhole Cover Inserts: Manufactured, plastic form, of size to fit between manhole frame and cover and designed to prevent stormwater inflow. Include handle for removal and gasket for gastight sealing.
1. Manufacturers:
    - a. FRW Industries; a Syneco Systems, Inc. company.
    - b. Knutson Enterprises.
    - c. L.F. Manufacturing, Inc.
    - d. Parson Environmental Products, Inc.



## 2.5 FIELD INSTALLED PIPE TO MANHOLE CONNECTORS

- A. Resilient Pipe Connectors: ASTM C 923, design specifically for field installation, for each pipe connection.

## 2.6 CLEANOUTS

- A. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.
  - 1. Manufacturers:
    - a. Canplas Inc.
    - b. IPS Corporation.
    - c. NDS Inc.
    - d. Plastic Oddities, Inc.
    - e. Sioux Chief Manufacturing Company, Inc.
    - f. Zurn Industries, Inc.; Zurn Light Commercial Specialty Plumbing Products.
- B. Frame and Cover: Traffic grade cast-iron according to the standards of the authorities having jurisdiction, as indicated or, where not indicated, in accordance with the following:
  - 1. Use medium-duty, top-loading classification cleanouts in landscaped and foot-traffic areas.
  - 2. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
  - 3. Use extra-heavy-duty, top-loading classification cleanouts in roads areas.
- C. Concrete Collar: Where not located as a casting embedded in pavement, provide cast-in-place concrete collar as indicated on Drawings or, where not indicated 18 by 18 by 12 inches deep.

## 2.7 NONPRESSURE-TYPE PIPE COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and stainless steel tension band and tightening mechanism on each end.
- B. Sleeve Materials:
  - 1. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Unshielded Flexible Couplings: Elastomeric sleeve with stainless steel shear ring and stainless steel-metal tension band and tightening mechanism on each end.

1. Manufacturers:
  - a. Dallas Specialty & Mfg. Co.
  - b. Fernco Inc.
  - c. Logan Clay Products Company (The).
  - d. Mission Rubber Company; a division of MCP Industries, Inc.
  - e. NDS Inc.
  - f. Plastic Oddities, Inc.

D. Ring-Type Flexible Couplings: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

1. Manufacturers:
  - a. Fernco Inc.
  - b. Logan Clay Products Company (The).
  - c. Mission Rubber Company; a division of MCP Industries, Inc.

## 2.8 RESTRAINED JOINTS

A. Push-on (DIP only) or mechanical joint type joint restraint for DIP to PVC transitions and where indicated on Drawings or where required by operating utility and in accordance with standards of operating utility.

1. Push-on Gaskets: AWWA C 111, for use on DIP only, approved for use on the pipe on which it is installed. Use only non-toxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
2. Mechanical Joint Glands, Gaskets and Bolts: AWWA C 111, the gland, gasket and bolts shall be part of an integral system by the same manufacturer and approved for use on the pipe on which it is installed. Installation shall require only standard mechanical joint assembly techniques. Bolts shall be 316 Stainless Steel. Use only non-toxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
3. cal joint assembly techniques. Bolts shall be 316 Stainless Steel. Use only non-toxic lubricants approved by the manufacturer and that will not support microbiological growth. Vegetable shortening shall not be used.
4. DIP Pressure Rating: 350 psi.
5. PVC Pressure Rating: rated at a 2:1 safety factor for the pipe on which it is installed.
6. Products: Subject to compliance with requirements, provide products by one of the following:
  - a. American-Cast Iron Pipe Co.
  - b. Griffin Pipe Co.
  - c. McWane Cast Iron Pipe Co..
  - d. U.S. Pipe Co.

- e. Ebba Iron Inc.
- f. Ford Meter Box Co.
- g. Sigma Corporation.

## 2.9 SPECIAL PIPE FITTINGS FOR DEFLECTION AND EXPANSION

- A. Ductile-Iron Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include 2 gasketed ball-joint sections and 1 or more gasketed sleeve sections, rated for 250-psig minimum working pressure and for offset and expansion indicated.
  - 1. Manufacturers:
    - a. EBAA Iron Sales, Inc.
    - b. Romac Industries, Inc.
    - c. Star Pipe Products.

## 2.10 GREASE TRAPS

- A. Description: Precast, reinforced-concrete vault, designed for A-16 load designation according to ASTM C 857 and made according to ASTM C 858, with internal; grease trap configuration as indicated on Drawings.
  - 1. Dimensions: as indicated on Drawings.
  - 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
  - 3. Riser Sections: ASTM C 478, precast, reinforced concrete, 4-inch minimum thickness, and lengths to provide depth indicated.
  - 4. Manhole Frames and Covers: Ferrous; 24 inch ID by 7 to 9 inch riser with 4 inch minimum width flange and 26 inch diameter cover. Include indented top design with lettering cast into cover, using wording or design required by agency having authority. Where no specific wording or design is required by agency, wording equivalent to "SANITARY SEWER" shall be cast.
    - a. Material: ASTM A 48, Class 35 gray iron, unless otherwise indicated.
    - b. Protective Coating: Foundry-applied, SSPC-Paint 16, coal-tar, epoxy-polyamide paint; 10-mil minimum thickness applied to all surfaces, unless otherwise
  - 5. Internal Components: as indicated on Drawings.

## 2.11 CONCRETE

- A. General: Class 3000 concrete in accordance with Section 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

- B. Portland Cement Design Mix: 3000 psi minimum, with 0.45 maximum water-cementitious materials ratio.
  - 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  - 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.
  
- C. Manhole Channels and Benches: Field formed from concrete.
  - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
    - a. Invert Slope: Minimum of 1 percent or as required to provide uniform slope between invert elevations indicated on Drawings.
  - 2. Benches: Concrete, sloped to drain into channel.
    - a. Slope: 8 percent.
  
- D. Ballast and Pipe Supports: Field formed from concrete.
  - 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
  - 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed steel.

## 2.12 CORROSION-PROTECTION PIPING ENCASEMENT

- A. Encasement for Underground Metal Pipe, Fittings and Appurtenances:
  - 1. Standards: ASTM A 674 or AWWA C105.
  - 2. Form: Tube.
  - 3. Material: LLDPE film of 0.008-inch minimum thickness.
  - 4. Color: Blue.

## 2.13 PIPE DETECTION MATERIALS

- A. Detectable Warning Tape: specified in Section titled "Earth Moving".
  
- B. Locator Wire In addition to warning tape where required by operating utility. Specified in Section titled "Earth Moving".

## PART 3 - EXECUTION

### 3.1 STANDARDS OF OPERATING UTILITY

- A. See paragraph 1.2.B above for information regarding execution standards of the operating utility.

### 3.2 EARTHWORK

- A. Refer to Section titled "Earth Moving" for excavating, trenching, and backfilling.
- B. Refer to Section titled "Earth Moving" for installation requirements of pipe detection materials.

### 3.3 PIPING APPLICATIONS

- A. Flexible pipe couplings may be used in applications below, unless otherwise indicated.
  - 1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping of different material type or size, unless otherwise indicated. No other use of flexible couplings will be permitted.
    - a. Unshielded flexible couplings for same or minor difference OD pipes.
    - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
    - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
- B. Special Pipe Fittings: Use for pipe expansion and deflection. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating shall be used only where indicated on the Drawings.
- C. Gravity-Flow, Nonpressure Sewer Piping: Use the following pipe materials as indicated on the Drawings.
  - 1. Ductile-iron, gravity sewer pipe; ductile-iron standard or compact fittings; gaskets; and gasketed joints.
  - 2. PVC sewer pipe and fittings, gaskets, and gasketed joints.

### 3.4 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated.

Where specific installation is not indicated, follow piping manufacturer's written instructions.

- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, and other installation requirements.
- C. Install manholes for changes in direction, unless fittings are indicated. Use fittings for service branch connections, unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or combination of both.
- F. Install gravity-flow, nonpressure, sanitary sewerage piping according to the following:
  - 1. Install piping pitched down in direction of flow, at the slope indicated or, where not indicated, at a minimum slope of 1/2 percent.
  - 2. Install piping with 36-inch minimum cover unless otherwise indicated.
  - 3. Install ductile-iron, gravity sewer piping according to ASTM A 746 and the standards of the operating utility.
  - 4. Install ductile-iron and special fittings according to AWWA C600, AWWA M41 and the standards of the operating utility.
  - 5. Install PVC sewer piping according to ASTM D 2321, ASTM F 1668 and the standards of the operating utility.
- G. Install corrosion-protection piping encasement over ductile-iron pipe and fittings according to ASTM A 674 or AWWA C105 and the standards of the operating utility.
- H. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

### 3.5 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure, sanitary sewerage piping according to the following:
  - 1. Join ductile-iron, gravity sewer piping according to AWWA C600 for push-on joints and the standards of the operating utility.
  - 2. Join ductile-iron and special fittings according to AWWA C600, AWWA M41 and the standards of the operating utility.
  - 3. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints and the standards of the operating utility.

4. Join dissimilar pipe materials with nonpressure-type, flexible couplings in accordance with manufacturer's written instructions.

### 3.6 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Form continuous concrete channels and benches between inlets and outlet.
- D. For manholes that occur in pavements, set tops of frames and covers flush with finished surface. Set tops 2 inches above finished surface elsewhere, unless otherwise indicated.
- E. Install manhole cover inserts in frame and immediately below cover in accordance with manufacturer's written instructions.

### 3.7 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to Sections 701, and 702 of the South Carolina Department of Transportation Standard Specifications for Highway Construction for measuring, mixing, transporting, and placing concrete.

### 3.8 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use pipe fittings of same material as pipe at branches for cleanouts and PVC pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
- B. Install cast-iron frames and covers.
  1. Use medium-duty, top-loading classification cleanouts in landscaped and foot-traffic areas.
  2. Use heavy-duty, top-loading classification cleanouts in vehicle-traffic service areas.
  3. Use extra-heavy-duty, top-loading classification cleanouts in roads areas.
  4. Set cleanout frames and covers located in earthen areas in cast-in-place concrete collar, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade
  5. Set cleanout frames and covers in pavement with tops flush with pavement surface.

### 3.9 SERVICE CONNECTION INSTALLATION

- A. Extend sanitary sewer-service piping and connect to building sanitary sewer system at outside face of building wall in locations and pipe sizes indicated.
  - 1. Terminate sanitary sewer service piping at building wall until building sanitary sewer piping is installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building sanitary sewer piping systems when those systems are installed.

### 3.10 CONNECTIONS TO EXISTING SANITARY SEWER

- A. Where required by operating utility, connections to existing piping or manholes shall be made in the presence of an authorized inspector. Notify the Architect at least 48 hours before starting a connection.
- B. Where indicated, construct new manhole over existing gravity main by cutting upper half of existing pipe after base of manhole is completed so as not to obstruct flow of the existing pipe.
- C. Where indicated, make connections to existing piping using commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete.
- D. Where indicated, make connections to existing underground manholes as follows:
  - 1. Core drill opening into existing manhole large enough to allow installation of resilient manhole connector.
  - 2. Install resilient manhole connector in manhole opening accordance with manufacturer's written instructions.
  - 3. Install pipe in resilient connector in accordance with manufacturer's written instructions.
  - 4. Cut end of connection pipe passing through manhole wall to be flush with inside wall, unless otherwise indicated.
  - 5. On outside of manhole wall, encase entering connection and pipe in 6 inches of concrete for minimum length of 12 inches to provide additional support of connector from connection to undisturbed ground.
  - 6. On inside of manhole wall, encase outside of pipe to flush with face of wall with grout. Form smooth invert channel transition to existing invert or complete installation of internal drop piping as applicable.
  - 7. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
- E. Protect piping and manholes to prevent concrete or debris from entering while making connections. Remove debris or other extraneous material that may accumulate.



### 3.11 CLOSING ABANDONED SANITARY SEWERAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed:
  - 1. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:
  - 1. Remove manhole and close open ends of remaining piping.
  - 2. Remove top of manhole down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
- C. Backfill to grade according to Section titled "Earth Moving."

### 3.12 PIPE DETECTION MATERIALS INSTALLATION

- A. Install continuous underground detectable warning tape and locator wire, where required by operating utility. during backfilling of trench for underground sanitary sewerage piping. Locate below finished grade, directly over piping and according to standards of operating utility. Pipe detection materials are specified in Section titled "Earth Moving."

### 3.13 FIELD QUALITY CONTROL

- A. During Installation: Inspect interior of piping, to determine whether line displacement or other damage has occurred, continuously during installation. Inspect after approximately 24 inches of backfill is in place, and again at completion of each section of piping between manholes.
  - 1. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 95 percent of piping diameter.
    - c. Crushed, broken, cracked, or otherwise damaged piping or manholes.
    - d. Infiltration: Water leakage into piping or manholes.
    - e. Exfiltration: Water leakage from or around piping.
  - 2. Replace defective piping and manholes using new materials, and repeat inspections until defects are within allowances specified.

- B. Testing: The Contractor shall notify the Architect at least 48 hours before the scheduled time of the official tests. Passing test performed without the Architect present will be rejected. The Contractor will be required to retest, with the Architect present, without additional compensation
1. Pipe deflection test: Each section of piping will be tested for internal diametric deflection by the use of a 5% mandrel.
    - a. The mandrel pull shall be performed according to the "Recommended Standards for Wastewater Facilities" by the Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten State Standards)" and the standards of the operating utility.
    - b. The Contractor shall not use any mechanical device for the mandrel pull.
    - c. Deflections of greater than 5% shall be corrected.
  2. Low Pressure Air Tests: Test gravity sewer piping according to UNI-B-6, and the standards of operating utility.
    - a. Prior to performing test, system shall be backfilled to final grade and a waiting period, specified by the operating utility, shall have passed.
    - b. All service connections shall be in place prior to testing.
    - c. Leaks and loss in test pressure constitute defects that must be repaired.
    - d. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.
- C. Preliminary Inspection: Make arrangements with Architect to conduct preliminary final inspection.
1. Pre-inspection: The Contractor shall conduct his own pre-inspection and confirm that the system is capable of passing prior to requesting the Architect's presence to witness the preliminary inspection.
    - a. Repair or remove and replace components where test results or pre-inspections indicate that they do not comply with specified requirements.
    - b. Remove all sand, dirt, brick, excess grout, and other foreign matter from manholes and piping. Material shall not be flushed into existing sewer lines
  2. Preliminary Inspection: The Contractor shall notify the Architect at least 48 hours before the scheduled time of the preliminary inspection.
    - a. Preliminary inspection shall include but shall not necessarily be limited to the following:
      - 1) A visual inspection of manholes. Requirements include: verification that manhole is plumb and at correct elevation; verification that frame and cover is properly installed, centered, grouted inside and out, and at proper elevation; verification that section joints are sealed watertight and properly grouted; verification that inverts and shelves

- are smooth, of correct slope, and properly formed; verification that steps are properly positioned, securely embedded, and undamaged; verification that drop manhole piping is properly installed and secure; verification that pipe openings are watertight, properly located, and properly grouted; verification that interior of manhole has been cleaned of dirt and construction debris and verification that grades in the vicinity of the manhole are properly established and well drained.
- 2) A visual inspection of piping. Requirements include: verification that piping is clean and unobstructed; verification that piping is straight and not visually deflected from a circular cross-section (i.e.: full moon when flashed or lamped); verification that no infiltration or exfiltration is visually evident.
  - 3) Verification of proper elevations, slopes, and horizontal and vertical alignment (under no circumstances will a line be accepted which is below the minimum slope required by the authorities having jurisdiction for a given line size.
- b. Repair or remove and replace components where test results or preliminary inspections indicate that they do not comply with specified requirements.
  - c. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- D. Final Inspection: Upon successful completion of the preliminary final inspection and after any required documentation has been received and approved by the authorities having jurisdiction, the Contractor, Architect, representatives of the authorities having jurisdiction shall conduct a final inspection of the system.
- a. The Contractor shall notify the Architect at least 48 hours before the desired time of the pre-inspection. The Architect shall endeavor to schedule attendance by representatives of the authorities having jurisdiction at the desired time; however, the Architect provides no guarantee of availability at that time. If unavailable, the Architect will schedule the representative at the soonest reasonable time. Final inspections will not be held without the attendance of both the Architect and a representative of the authorities having jurisdiction.
  - b. ities having jurisdiction at the desired time; however, the Architect provides no guarantee of availability at that time. If unavailable, the Architect will schedule the representative at the soonest reasonable time. Final inspections will not be held without the attendance of both the Architect and a representative of the authorities having jurisdiction.
  - c. of the authorities having jurisdiction.
  - d. Final inspection shall include but shall not necessarily be limited to the items listed for the pre-inspection.

- e. Repair or remove and replace components where test results or final inspections indicate that they do not comply with specified requirements.
  - f. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- E. Video Documentation: Immediately after final approval of the completed system, complete a videotaped inspection of the completed piping system utilizing equipment made expressly for the purpose. Provide a written report, inspection logs, and a copy of the inspection videotape to the Architect.
- F. Reports of Inspection Activities.
- 1. Where required, the Architect will provide final required documentation to authorities having jurisdiction for the purpose of obtaining a Permit to Operate. Promptly provide any documents required from Contractor. Once Permit to Operate is received, Architect will notify Contractor. Make final connections, when necessary, and place system in operation. Do NOT place system in operation before notification by Architect that Permit to Operate has been received.

END OF SECTION 333100

## SECTION 321313 - CONCRETE PAVING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
  - 1. Driveways and roadways.
  - 2. Parking lots.
  - 3. Curbs and gutters.
  - 4. Walkways.
  - 5. Unit paver base.
  - 6. Pavement markings.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Samples: 10-lb sample of exposed aggregate.
- D. Qualification Data: For manufacturer.
- E. Field quality-control test reports.
- F. Minutes of preinstallation conference.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with the equipment, material and production requirements of Section 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

- B. Concrete Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 and ASTM C 1077 to perform material evaluation tests and to design concrete mixtures.
- C. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.
  - 1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 3. Obtain Architect's approval of mockups before starting construction.
  - 4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
  - 5. Demolish and remove approved mockups from the site when directed by Architect.
  - 6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
  - 1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete producer.
    - d. Concrete pavement subcontractor.
- E. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
  - 1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.
    - a. For locations within areas of DOT jurisdiction, perform all work, testing, and inspections in accordance with applicable DOT standards and procedures.

## 1.5 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

1. Where Work activities encroach into public rights-of-way, provide traffic control to maintain safe transit of work area by vehicular and pedestrian traffic.
  - a. All traffic control shall be in accordance with the requirements of the authorities having jurisdiction.
- B. Environmental Limitations: Do not install concrete paving if subgrade is frozen, wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the ambient air temperature is below, or is expected to fall below, 40 deg F during the time of placement.
- C. Pavement-Marking: Proceed with pavement marking only on clean, dry surfaces; at a minimum ambient or surface temperature of at least 55 deg F, and not exceeding 95 deg F; and at a maximum relative of 85%. Do not apply pavement markings if rain is imminent or expected before time required for adequate drying.

## PART 2 - PRODUCTS

### 2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
  1. Use flexible or curved forms for curves as necessary in order to prevent a chord effect in the alignment of the finished work.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

### 2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Plain Steel Wire: ASTM A 82, as drawn.
- D. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.
- E. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

- F. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
- H. ater compressive strength than concrete, and as follows:
  - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
  - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
- I. Epoxy Repair Coating: Liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.
- J. Zinc Repair Material: ASTM A 780.

## 2.3 CONCRETE MATERIALS

- A. Concrete: Class 3000 concrete in accordance with Section 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- B. Exposed Aggregate: Selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate as follows:
  - 1. Aggregate Sizes: 3/4 to 1 inch nominal.
- C. Water: ASTM C 94/C 94M.
- D. Admixtures: Air-entraining, accelerating, retarding, and water reducing admixtures shall be in accordance with Section 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

## 2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.



- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
  - 1. Products:
    - a. Axim Concrete Technologies; Cimfilm.
    - b. Burke by Edeco; BurkeFilm.
    - c. ChemMasters; Spray-Film.
    - d. Conspec Marketing & Manufacturing Co., Inc.; Aquafilm.
    - e. Dayton Superior Corporation; Sure Film.
    - f. Euclid Chemical Company (The); Eucobar.
    - g. Kaufman Products, Inc.; Vapor Aid.
    - h. Lambert Corporation; Lambco Skin.
    - i. L&M Construction Chemicals, Inc.; E-Con.
    - j. MBT Protection and Repair, ChemRex Inc.; Confilm.
    - k. Meadows, W. R., Inc.; Sealtight Evapre.
    - l. Metalcrete Industries; Waterhold.
    - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
    - n. Sika Corporation, Inc.; SikaFilm.
    - o. Symons Corporation; Finishing Aid.
- E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
  - 1. Products:
    - a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
    - b. Burke by Edoko; Aqua Resin Cure.
    - c. ChemMasters; Safe-Cure Clear.
    - d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
    - e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
    - f. Euclid Chemical Company (The); Kurez DR VOX.
    - g. Kaufman Products, Inc.; Thinfilm 420.
    - h. Lambert Corporation; Aqua Kure-Clear.
    - i. L&M Construction Chemicals, Inc.; L&M Cure R.
    - j. Meadows, W. R., Inc.; 1100 Clear.
    - k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
    - l. Symons Corporation; Resi-Chem Clear.
    - m. Tamms Industries Inc.; Horncure WB 30.
- F. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.
  - 1. Products:
    - a. Anti-Hydro International, Inc.; AH Curing Compound #2 WP WB.
    - b. Burke by Edoco; Resin Emulsion White.

- c. ChemMasters; Safe-Cure 2000.
  - d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
  - e. Dayton Superior Corporation; Day-Chem White Pigmented Cure (J-10-W).
  - f. Euclid Chemical Company (The); Kurez VOX White Pigmented.
  - g. Kaufman Products, Inc.; Thinfilm 450.
  - h. Lambert Corporation; Aqua Kure-White.
  - i. L&M Construction Chemicals, Inc.; L&M Cure R-2.
  - j. Meadows, W. R., Inc.; 1200-White.
  - k. Symons Corporation; Resi-Chem White.
  - l. Tamms Industries, Inc.; Horncure 200-W.
- G. Special Curing Compound for Integrally Colored Concrete: ASTM C 309, water-based acyclic emulsion curing compound, formulated for use with integrally colored concrete.
1. Products: One of the following or equal:
    - a. COLORCURE Concrete Sealer; L.M. Scofield Co.
    - b. QC COLOR CURE; QC Construction Products.

## 2.5 RELATED MATERIALS

- A. Preformed Joint Filler: AASHTO M 153, preformed sponge rubber expansion joint filler.
1. Use only materials manufactured from rubber.
  2. Use materials that require a load of not less than 340 kPa or greater than 5,200kPa to compress to 50% of its thickness when tested in accordance with AASHTO T 42.
  3. Use materials that have a recovery of at least 70% when tested in accordance with AASHTO T 42.
  4. For locations within areas of SCDOT jurisdiction, use only products that are listed on SCDOT Qualified Product List 81.
- B. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
1. Manufacturers:
    - a. Bayer Corporation.
    - b. ChemMasters.
    - c. Conspec Marketing & Manufacturing Co., Inc.
    - d. Davis Colors.
    - e. Lambert Corporation.
    - f. QC Construction Products.
    - g. Scofield, L. M. Company.
    - h. Solomon Colors.

2. Color: As selected by Architect from manufacturer's full range.
- C. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- D. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- E. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to requirements, and as follows:
  1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- F. Chemical Surface Retarder: Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.
  1. Products:
    - a. Burke by Edeco; True Etch Surface Retarder.
    - b. ChemMasters; Exposee.
    - c. Conspec Marketing & Manufacturing Co., Inc.; Delay S.
    - d. Euclid Chemical Company (The); Surface Retarder S.
    - e. Kaufman Products, Inc.; Expose.
    - f. Metalcrete Industries; Surfard.
    - g. Nox-Crete Products Group, Kinsman Corporation; Crete-Nox TA.
    - h. Scofield, L. M. Company; Lithotex.
    - i. Sika Corporation, Inc.; Rugasol-S.
- G. Pigmented Mineral Dry-Shake Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.
  1. Products:
    - a. Conspec Marketing & Manufacturing Co., Inc.; Conshake 600 Colortone.
    - b. Dayton Superior Corporation; Quartz Tuff.
    - c. Euclid Chemical Company (The); Surfex.
    - d. Lambert Corporation; Colorhard.
    - e. L&M Construction Chemicals, Inc.; Quartz Plate FF.
    - f. MBT Protection and Repair, ChemRex Inc.; Mastercron.
    - g. Metalcrete Industries; Floor Quartz.
    - h. Scofield, L. M. Company; Lithochrome Color Hardener.
    - i. Symons Corporation; Hard Top.

2. Color: As selected by Architect from manufacturer's full range.
- H. Textured Pool Deck Coating: Colored, textured, temperature-reducing cement surface coating, for horizontal concrete pool deck application.
1. Product:
    - a. Keystone Kool Deck; Mortex Manufacturing Co.
  2. Physical Properties: Provide pool deck coating system with the following minimum physical property requirements when tested according to test methods indicated:
    - a. Compressive Strength: 2,000 pdi per ASTM C 109.
    - b. Freeze-Thaw Resistance: No chipping, cracking, or delamination for 70 cycles per ASTM C 666.
    - c. Abrasion Resistance: 3 g maximum loss per ASTM C 944.
  3. Color: As selected by Architect from manufacturer's full range.
- I. Color Stain: Acidic, deeply-penetrating, water-based stain solution, for horizontal concrete surface application.
1. Products:
    - a. Stain-Crete; Increte Systems.
    - b. Lithochrome Chemstain; L. M. Scofield Company.
    - c. QC Patina Stain; QC Construction Products.
  2. Color: As selected by Architect from manufacturer's full range.
- J. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.
- K. Oyster Shell for Tabby Finish: No. 3 size gradation.

## 2.6 PAVEMENT MARKINGS

- A. Pavement-Marking Paint: Reflectorized, heavy metals free, fast drying, waterborne paint for pavement markings in accordance with Section 625 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Color: As indicated.
- B. Thermoplastic Pavement Markings: Reflectorized mixture of thermoplastic binder and spherical glass beads in accordance with Section 627 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Color: As indicated.

- C. Glass Beads: AASHTO M 247, Type 1.

## 2.7 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2500-psi minimum compressive strength, 5 inches high by 9 inches wide by 72 inches long. Provide chamfered corners, drainage slots on underside, and holes for anchoring to substrate.
  - 1. Dowels: Galvanized steel, diameter 1/8" smaller than anchor holes provided in wheel stop, 24-inch minimum length.
- B. Wheel Stops: Solid, integrally colored, 96 percent recycled HDPE or commingled postconsumer and postindustrial recycled plastic; UV stabilized; 4 inches high by 6 inches wide by 72 inches long. Provide chamfered corners, drainage slots on underside, and holes for anchoring to substrate.
  - 1. Dowels: Galvanized steel, diameter 1/8" smaller than anchor holes provided in wheel stop, 24-inch minimum length.
  - 2. Adhesive: waterproof epoxy as recommended by manufacturer.

## 2.8 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to Section 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 3000 psi.
  - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: in accordance with Section 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
  - 3. Slump Limit: 5 inches, plus or minus 1 inch, except where lower slump is required for automatic machine placement or other specialized applications.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
  - 1. Air Content: 6 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size
- D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

- E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to the requirements of Section 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction as follows:
  - 1. Fly Ash: 20 percent.
  - 2. Ground Granulated Blast-Furnace Slag: 50 percent.
- F. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

## 2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to Sections 501 and 701 of the South Carolina Department of Transportation Standard Specifications for Highway Construction. Furnish batch certificates for each batch discharged and used in the Work.
  - 1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. For concrete curb and gutter and pavements to be subjected to vehicular traffic, proof-roll prepared subbase surface with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
  - 1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.
  - 2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 25 tons.
  - 3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Section titled "Earth Moving."
- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

### 3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

### 3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

### 3.4 STEEL REINFORCEMENT

- A. General: Comply with Sections 501 and 703 of the South Carolina Department of Transportation Standard Specifications for Highway Construction and CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

### 3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
  - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
  - 2. For locations within areas of DOT jurisdiction, perform all work, testing, and inspections in accordance with applicable DOT standards and procedures.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
  2. Provide tie bars at sides of pavement strips where indicated.
  3. Butt Joints: Use bonding agent or epoxy bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
1. Unless otherwise indicated, joints shall be 3/4 inch in width.
  2. Locate expansion joints at intervals of 100 feet, unless otherwise indicated.
  3. Extend joint fillers full width and depth of joint.
  4. Place top of joint filler flush with finished concrete surface.
  5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
  6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction (Control) Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/2-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces unless indicated to remain.
  2. Spacing in Pavements: Unless otherwise indicated, locate as follows:
    - a. Locate transverse contraction joints at intervals twice the width of the pavement, not to exceed 10 feet.
    - b. Where the pavement width exceeds 10 feet to a maximum of 24 feet, locate a longitudinal contraction joint along the centerline of the pavement.
    - c. Where the pavement width exceeds 24 feet, locate longitudinal contraction joints at evenly spaced divisions not to exceed 10 feet.
  3. Spacing in Curb: Unless otherwise indicated, locate contraction joints to coincide with the adjoining concrete pavement or, where an adjoining concrete pavement does not exist, at an interval of 10 feet.



- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/2-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces unless indicated to remain.

### 3.6 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with the requirements of Sections 501, 701, and 720 of the South Carolina Department of Transportation Standard Specifications for Highway Construction for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to Sections 501 and 720 of the South Carolina Department of Transportation Standard Specifications for Highway Construction by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. Screed pavement surfaces with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

- K. ion, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
- L. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.
  - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- M. When adjoining pavement lanes are placed in separate pours, do not operate concrete installation equipment on placed concrete until it has attained 85 percent of its 28-day compressive strength.
- N. Cold-Weather Placement: Comply with Sections 501, 701, and 702 of the South Carolina Department of Transportation Standard Specifications for Highway Construction and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. Concrete operations shall not be undertaken when air temperature has fallen to or is expected to fall below 40 deg F.
  - 2. Do not use frozen materials or materials containing ice or snow.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- O. Hot-Weather Placement: Comply with Sections 501, 701, and 702 of the South Carolina Department of Transportation Standard Specifications for Highway Construction and as follows when hot-weather conditions exist:
  - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to

power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
2. dicular to line of traffic to provide a uniform, fine-line texture.

### 3.8 SPECIAL FINISHES

A. Monolithic Exposed-Aggregate Finish: Expose coarse aggregate in pavement surfaces as follows:

1. Immediately after float finishing, spray-apply chemical surface retarder to pavement according to manufacturer's written instructions.
2. Cover pavement surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon-bristle broom.
4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.

B. Seeded Exposed-Aggregate Finish: Immediately after initial floating, spread a single layer of aggregate uniformly on pavement surface. Tamp aggregate into plastic concrete, and float finish to entirely embed aggregate with mortar cover of 1/16 inch.

1. Spray-apply chemical surface retarder to pavement according to manufacturer's written instructions.
2. Cover pavement surface with plastic sheeting, sealing laps with tape, and remove sheeting when ready to continue finishing operations.
3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon-bristle broom.
4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.

C. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on pavement surface according to manufacturer's written instructions and as follows:

1. Uniformly spread 25 lb/100 sq. ft. dampened slip-resistive aggregate over pavement surface in 2 applications. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
2. Uniformly distribute approximately two-thirds of slip-resistive aggregate over pavement surface with mechanical spreader, allow to absorb moisture, and embed by power floating. Follow power floating with a second slip-resistive aggregate application, uniformly distributing remainder of material at right angles to first application to ensure uniform coverage, and embed by power floating.

3. form coverage, and embed by power floating.
  4. Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.
  5. After curing, lightly work surface with a steel wire brush or abrasive stone and water to expose non-slip aggregate.
- D. Rock-Salt Finish: After initial floating, uniformly spread 5 lb/100 sq. ft. rock salt over pavement surface.
1. Embed rock salt into plastic concrete, power float concrete, and trowel finish.
  2. Cover pavement surface with 1-mil- thick polyethylene sheet and remove sheet when concrete has hardened and 7-day curing period has elapsed.
  3. After 7-day curing period, saturate concrete with water and broom-sweep surface to dissolve remaining rock salt.
- E. Pigmented Mineral Dry-Shake Hardener Finish: After initial floating, apply dry-shake materials to pavement surface according to manufacturer's written instructions and as follows:
1. Uniformly spread dry-shake hardener at a rate of 100 lb/100 sq. ft., unless greater amount is recommended by manufacturer to match pavement color required.
  2. Uniformly distribute approximately two-thirds of dry-shake hardener over pavement surface with mechanical spreader, allow to absorb moisture, and embed by power floating. Follow power floating with a second dry-shake hardener application, uniformly distributing remainder of material at right angles to first application to ensure uniform color, and embed by power floating.
  3. After final floating, apply a hand-trowel finish followed by a broom finish to concrete.
  4. Cure concrete with curing compound recommended by dry-shake hardener manufacturer. Apply curing compound immediately after final finishing.
- F. Textured Pool Deck Coating Application: Prepare and apply pool deck coating according to manufacturer's written instructions.
- G. Color Stain Application: Prepare, apply, and finish color stain according to manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  2. Do not apply to concrete that is less than 30 days old.
  3. Apply 2 coats of concrete floor stain. Allow floor to completely dry after each coat. Do not scrub clean between coats.
  4. Sealing: Uniformly apply manufacturer's recommended sealer designed for use with color stain. Apply according to manufacturer's written instructions.
- H. Tabby Finish: Immediately after floating, broadcast a single layer of oyster shell uniformly onto the concrete surface. Tamp seeded shell into plastic concrete to entirely embed shell with mortar cover of 1/16 inch.

1. Spray-apply chemical surface retarder to concrete according to manufacturer's written instructions.
2. Cover concrete surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon bristle broom.
4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.

### 3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with Sections 501, 701, and 702 of the South Carolina Department of Transportation Standard Specifications for Highway Construction for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
  1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

### 3.10 PAVEMENT TOLERANCES

- A. Comply with tolerances of Section 501 of the South Carolina Department of Transportation Standard Specifications for Highway Construction and as follows:
1. Elevation: 1/4 inch.
  2. Thickness: Plus 3/8 inch, minus 1/4 inch.
  3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/4 inch.
  4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
  5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
  6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
  7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
  8. Joint Spacing: 3 inches.
  9. Contraction Joint Depth: Plus 1/4 inch, no minus.
  10. Joint Width: Plus 1/8 inch, no minus.

### 3.11 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Sweep and clean surface to eliminate loose material and dust.
- C. Surface shall be dry and free of glaze, oil, dirt, grease or other foreign contaminants.
- D. Apply paint with mechanical equipment for the application of waterborne asphalt paint meeting the requirements of Section 625 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
  2. Broadcast glass beads uniformly into wet pavement markings at a rate of 6 lb/gal.
- E. Apply thermoplastic pavement markings with mechanical equipment for the application of thermoplastic pavement markings meeting the requirements of Section 627 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
1. Apply at manufacturer's recommended rates to provide a finished thickness of 90 mils.
  2. Glass beads shall be mechanically applied to the surface of the thermoplastic material immediately after it is applied to the pavement surface and while it is still molten. Uniformly apply at a rate of 12 lb per 100 sq ft.

- F. Apply to produce pavement markings of the dimensions indicated; which are straight or of uniform curvature; of consistent width; and with crisp, uniform, edges.
  - 1. The finished line markings shall be free from waviness and the lateral deviations shall not exceed 2 inches in 15 feet.
  - 2. No markings shall be less than the specified width.

### 3.12 WHEEL STOPS

- A. Install wheel stops in bed of adhesive as recommended by manufacturer.
- B. Securely attach wheel stops to pavement with not less than two galvanized-steel dowels embedded at one-quarter to one-third points. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of wheel stop.

### 3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Contractual responsibilities for testing are identified in Division 1 Section "Quality Requirements". Responsible party will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day, except for locations within areas of DOT jurisdiction which shall be sampled according to applicable DOT rates.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  - 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
  - 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
  - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days, 2 specimens at 28 days and 1 specimen at 56 days.

- a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. : Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- H. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- I. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.14 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude vehicular traffic from pavement for at least 7 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.



- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

## SECTION 312000 - EARTH MOVING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses, and exterior plants.
  - 2. Excavating and backfilling for buildings and structures.
  - 3. Drainage course for slabs-on-grade.
  - 4. Base course for concrete walks and pavements.
  - 5. Base course for asphalt paving.
  - 6. Base course for gravel paving system.
  - 7. Base course for grass paving system.
  - 8. Subsurface drainage backfill for walls and trenches.
  - 9. Excavating and backfilling trenches and pits for buried utilities.

#### 1.3 UNIT PRICES

- A. Unit prices for earth moving are included in Division 01 Section "Unit Prices."
- B. Dimensions of excavations shall be established and accepted by Architect prior to initiation of Work. Quantity for payment shall be based on calculation of volume using accepted dimensions. Volumes documented by truck counts are not acceptable.
- C. Volumes shall be based on in-situ measure. Swell factors for expansion of excavated material will not be accepted.
- D. Payment shall not be made without prior acceptance of proposed work by the Architect, or for quantities in excess of the quantity accepted by the Architect.
- E. Rock Removal
  - 1. Volume of naturally occurring in-situ rock actually removed, measured in original position, but not to exceed the following:
    - a. 24 inches outside of concrete forms other than at footings.
    - b. 12 inches outside of concrete forms at footings.

- c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    - e. 6 inches beneath bottom of concrete slabs-on-grade.
    - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.
  2. Excavated rock shall be removed from the site and legally disposed.
- F. Excavating Unsatisfactory Soils and Hauling Offsite
  1. Volume of naturally occurring in-situ unsatisfactory soil removed, measured in original position.
  2. Excavated unsatisfactory soil shall be removed from the site and legally disposed.
- G. Excavating Unsatisfactory Soils and Stockpiling Onsite
  1. Volume of naturally occurring in-situ unsatisfactory soil removed, measured in original position.
  2. Excavated unsatisfactory soils shall be stockpiled onsite at a location designated by the Architect. Stockpile height shall not exceed ten feet without prior authorization from the Architect.
- H. Backfill of Excavations of Unsatisfactory Soils or Rock with Satisfactory Soils from an Onsite Source
  1. Volume of satisfactory soils from an onsite source approved by the Architect.
  2. Replace excavated material as quickly as practical after excavation, but not before review and acceptance of excavation by Architect.
  3. Volume for payment shall be the same as established for Excavating Unsatisfactory Soils or Rock Removal as applicable.
- I. Backfill of Excavations of Unsatisfactory Soils or Rock with Borrow Soil.
  1. Volume of borrow soil (imported from offsite).
  2. Replace excavated material as quickly as practical after excavation, but not before review and acceptance of excavation by Architect.
  3. Volume for payment shall be the same as established for Excavating Unsatisfactory Soils or Rock Removal as applicable.
- J. Unit Price No. 5 – Cement Modified Subgrade
  1. Area of existing subgrade soil material to be modified in-place by the addition of Portland cement in accordance with the requirements of Section 301 of the SCDOT Standard Specification for Highway Construction.
  2. Application rate shall be 60 lbs per square yard.
  3. Minimum mixing depth shall be 16”.

4. Unit for payment shall be per square yard of subgrade material prepared.

#### 1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
- B. Base Course: Course placed between the subgrade and paving materials[ (or a choker course, where applicable)].
- C. Choker Course: Course placed between the base course and paving materials.
- D. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- E. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- F. Drainage Course: Course supporting a slab-on-grade that also minimizes upward capillary flow of pore water.
- G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
  1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
  2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
  3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- H. Fill: Soil materials used to raise existing grades.
- I. Filter aggregate: Aggregate backfill material that acts as a filter medium in subdrainage systems.
- J. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
  1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch-wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling

force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.

2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.

K. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

L. Subgrade: Soil surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base course, subbase, drainage fill, or topsoil materials, as applicable.

M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

## 1.5 SUBMITTALS

A. Product Data: For the following:

1. Geotextile.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.
3. [Certification that Recycled Portland Cement Concrete Base Course (RPCCBC) meets the requirements of Section 305 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.]

C. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

D. Minutes of pre-excavation conference.

## 1.6 QUALITY ASSURANCE

A. Blasting: Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:

1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will

- prevent damage to site improvements and structures on Project site and adjacent properties.
2. Seismographic monitoring during blasting operations.
- B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:
1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
  2. Seismographic monitoring during blasting operations.
- C. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- D. Pre-excavation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
- E. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.
    - a. For locations within areas of DOT jurisdiction, perform all work, testing, and inspections in accordance with applicable DOT standards and procedures.
- 1.7 PROJECT CONDITIONS
- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.
1. Notify Architect not less than two days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Architect's written permission.
  3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.
- C. Where Aggregate Choker Course (ACC), Coarse Aggregate Base Course (CABC), or Sandy Gravel Base Courses (SGBC) is indicated, plan construction to mitigate potential contamination with sediment from adjoining grounds and vehicular traffic.

1. Where practicable, delay installation until as late as possible in the construction sequence to avoid potential for contamination.
2. Implement and maintain protection measures, as indicated in the "Protection" article below, immediately after installation is complete.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
  1. For locations within areas of DOT jurisdiction, Satisfactory Soils shall be as defined by Standard Specifications for that DOT for the applicable work classification.
    - a. For drainage pipe culverts located within areas of SCDOT jurisdiction, backfill shall only be sand or gravel meeting the requirements of Soil Classification Groups A-1, in accordance with Supplementary Technical Specification SC-M-714 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- C. Unsatisfactory Soils: ASTM D 2487 Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT, AASHTO M 145 Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7, or a combination of these groups.
  1. Unsatisfactory soils also include satisfactory soils not brought to within 2 percent of optimum moisture content at time of compaction. These soils are not eligible for compensation under any Unit Price provisions for removal of unsatisfactory soil.
- D. "Skinned" Clay for Ball Field Infields: Premixed and processed soil mixture, free of rock or gravel in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
  1. The mix shall consist of the following percentages:
    - a. 60% sand (SCDOT FA-10)
    - b. 30% clay
    - c. 10% silt

2. A ¼" depth of vitrified clay soil conditioner such as TurFace, Terra-Green, Pave' Rouge, or Diamond Pro will be applied and uniformly incorporated into surface after placement and fine grading is complete.
  3. Mixture shall be red in color.
- E. Clay Mix for Pitchers Mound and Home Plate Area: Premixed and processed soil mixture, free of rock or gravel in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
1. The mix shall consist of the following percentages:
    - a. 50% sand (SCDOT FA-10)
    - b. 40% clay
    - c. 10% silt
  2. Mixture shall be red in color.

## 2.2 AGGREGATE MATERIALS

- A. All sand and aggregate materials shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
- B. Aggregate materials shall not be composed of marine limestone or slag unless specifically allowed in the individual paragraph(s) below.
- C. Graded Aggregate Base Course (GABC): Naturally or artificially graded crushed stone (macadam) or marine limestone in accordance with Section 305 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- D. Coarse Aggregate Base Course (CABC): Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- E. Aggregate Choker Course (ACC): Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #8M as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- F. Sandy Gravel Base Course (SGBC): Naturally or artificially graded mixture of sand and crushed gravel or stone, in accordance with the following gradation requirements:

<u>Sieve</u>	<u>% Passing</u>
1"	100
3/4"	90-100
3/8"	70-80
#4	55-70
#10	45-55



#40	25-35
#200	3-8

- A. Recycled Portland Cement Concrete Base Course (RPCCBC): Graded mixture of crushed, recycled Portland cement concrete mixed together with sand or sand-gravel in accordance with Section 305 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- B. South Carolina Department of Transportation Standard Specifications for Highway Construction.
  - 1. Prior to installation, provide certification, by qualified Geotechnical Testing Agency, that RPCCBC is in accordance with the requirements of Section 305 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- C. Bedding Course: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
  - 1. For locations within areas of SCDOT jurisdiction, bedding for drainage pipe culverts shall be in accordance with Supplementary Technical Specification SC-M-714 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- D. Drainage Course: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- E. Filter Aggregate: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #57 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- F. Sand: Natural or manufactured sand in accordance with the gradation requirements for Fine Aggregate FA-10 (natural) or FA-10M (manufactured) as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- G. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.
- H. Recycled Glass Mix: Material to be provided by Owner (Charleston County-Bees Ferry Landfill) for transportation and installation by Contractor. Contractor shall coordinate with Bees Ferry Landfill as indicated on Drawings for availability.
  - 1. Size Range: As indicated on Drawings.
  - 2. Color: As indicated on Drawings

- I. Recycled Concrete Slabs: Irregular, broken concrete slab sections, salvaged from previous construction. Exposed surface shall be previously float-finished and reasonably unblemished. Each section shall be of the size and thickness indicated and free of internal cracks. Individual sections shall be free of attached fittings and protruding reinforcing wire or bars or, if present, reinforcing shall be trimmed as close as reasonably possible.
- J. lose as reasonably possible.
  - 1. Size Range: As indicated on Drawings.
  - 2. Thickness: As indicated on Drawings.

## 2.3 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
  - 1. Survivability: Class 1, Type A, B, or C; SCDOT Standard Specs
  - 2. Grab Tensile Strength: 90 lbf; ASTM D 4632.
  - 3. Puncture Strength: 60 lbf; ASTM D 4833.
  - 4. Trapezoidal Tear: 40 lbf; ASTM D-4533
  - 5. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751.
  - 6. Permittivity: 2.2 second-1, minimum; ASTM D 4491.
  - 7. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.
  - 8. Water Flow Rate: 150 gal/min/ft<sup>2</sup>; ASTM D-4491
- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 15 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
  - 1. Survivability: Class 1, Type D; SCDOT Standard Specs
  - 2. Grab Tensile Strength: 200 lbf; ASTM D 4632.
  - 3. Mullen Burst: 400 psi; ASTM D-3786
  - 4. Puncture Strength: 90 lbf; ASTM D 4833.
  - 5. Trapezoidal Tear: 75 lbf; ASTM D-4533
  - 6. Apparent Opening Size: No. 50 sieve, maximum; ASTM D 4751.
  - 7. Permittivity: 0.05 second-1, minimum; ASTM D 4491.
  - 8. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.
  - 9. Water Flow Rate: 5 gal/min/ft<sup>2</sup>; ASTM D-4491

## 2.4 FLOWABLE FILL

- A. Flowable Fill: Low-density, self-compacting, flowable concrete material (controlled low-strength material) in accordance with the requirements for Excavatable Flowable Fill as

defined by Section 210 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

## 2.5 PIPE DETECTION MATERIALS

- A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
  - 1. Red: Electric.
  - 2. Yellow: Gas, oil, steam, and dangerous materials.
  - 3. Orange: Telephone and other communications.
  - 4. Blue: Water systems.
  - 5. Green: Sewer systems.
- B. Locator Wire In addition to warning tape where required by operating utility.
  - 1. Material, Gauge and Insulation: as required by operating utility.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section titled "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Section titled "Site Clearing," during earthwork operations.

### 3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Where required, install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

### 3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.
- B. Explosives: Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.
  1. Perform blasting without damaging adjacent structures, property, or site improvements.
  2. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.

### 3.4 EXCAVATION, GENERAL

- A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect, based on the recommendations of the Geotechnical Testing Agency. The Contract Sum will be adjusted for rock excavation [according to unit prices included in the Contract Documents][ based on a mutually acceptable price]. Changes in the Contract time may be authorized for rock excavation.
  1. If excavated materials intended for fill and backfill include unsatisfactory soil materials or rock, replace with satisfactory soil materials. The Contract Sum will be adjusted for replacement of unsatisfactory soils [according to unit prices included in the Contract Documents][ based on a mutually acceptable price].
  2. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
    - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
  3. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
    - a. 24 inches outside of concrete forms other than at footings.
    - b. 12 inches outside of concrete forms at footings.
    - c. 6 inches outside of minimum required dimensions of concrete cast against grade.

- d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
- e. 6 inches beneath bottom of concrete slabs on grade.
- f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

### 3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
  - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
  - 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
  - 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

### 3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

### 3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
  - 1. Beyond building perimeter and where specific gradients, lines, depths, and elevations are not indicated, excavate trenches to allow installation of top of pipe below frost line or a minimum depth of 36" below finished grade, whichever is greater.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
  - 1. Clearance: 12 inches each side of pipe or conduit or as indicated.

- C. Trench bottoms where bedding course is indicated: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course, unless otherwise indicated.
  - 1. See "Utility Trench Backfill" paragraph below for bedding course requirements.
- D. Trench bottoms where no bedding course is indicated: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
  - 1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
  - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
  - 3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

### 3.8 SUBGRADE INSPECTION

- A. Notify Architect when excavations have reached required subgrade.
- B. If Architect, based on the recommendations of the Geotechnical Testing Agency, determines that unsatisfactory soil is present: a) continue excavation and replace with compacted backfill or fill material or; b) prepare cement modified subgrade as directed.
  - 1. Authorized additional excavation and replacement material or cement modified subgrade will be paid for [according to unit prices included in the Contract Documents][ based on a mutually acceptable price].
- C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades. Unless otherwise directed by Architect, based on the recommendations of the Geotechnical Testing Agency (typically, in order to avoid over-compaction of porous pavement subgrades) perform proof-rolls as follows:
  - 1. Completely proof-roll subgrade in one direction and, where dimensions permit, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
  - 2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 25 tons.
  - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, based on the recommendations of the Geotechnical Testing Agency, and replace with compacted backfill or fill as directed.

- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, based on the recommendations of the Geotechnical Testing Agency, without additional compensation.

### 3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations, wall footings, utility pipe, or other construction as directed by Architect, based on the recommendations of the Geotechnical Testing Agency.

### 3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### 3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following, as applicable:
  - 1. Making arrangements for required testing and evaluation of subdrainage requirements by Geotechnical Testing Agency.
  - 2. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
  - 3. Surveying locations of underground utilities for Record Documents.
  - 4. Testing and inspecting underground utilities.
  - 5. Removing concrete formwork.
  - 6. Removing trash and debris.
  - 7. Removing temporary shoring and bracing, and sheeting.
  - 8. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.
- C. Comply with the requirements indicated in the paragraph below titled "Compaction of Soil Backfills and Fills".

### 3.12 UTILITY TRENCH BACKFILL

- A. For locations within areas of SCDOT jurisdiction, bedding and backfill for drainage pipe culverts shall be in accordance with Supplementary Technical Specification SC-M-714 of the South Carolina Department of Transportation Standard Specifications for Highway Construction.
- B. Bedding Course: Where indicated or required by agency having jurisdiction, place and compact bedding course on trench bottoms. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
  - 1. Unless otherwise indicated or required by agency having jurisdiction, bedding course shall be required for the following pipe materials:
    - a. Corrugated High Density Polyethylene Pipe (AASHTO M 252M)
    - b. Corrugated Steel Pipe (ASTM A 760)
    - c. Gravity Flow Polyvinyl Chloride Pipe (ASTM D 3034)
    - d. Gravity Flow Ductile Iron Pipe (ASTM A 746)
    - e. Elliptical Concrete Pipe (ASTM C 507)
    - f. Concrete Box Culvert (ASTM C 1433)
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings as directed by Architect, based on the recommendations of the Geotechnical Testing Agency.
- D. Flowable Fill: Where indicated or required by agency having jurisdiction, place backfill of flowable fill over the utility pipe or conduit for the full depth of the trench to final subgrade elevation.
- E. Initial Backfill—Bedding Material: Where indicated or required by agency having jurisdiction, place and compact initial backfill of bedding course to a height of 2 inches over the utility pipe or conduit.
  - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Initial Backfill—Satisfactory Soil: Where no other initial backfill is indicated, place and compact initial backfill of satisfactory soil to a height of 6 inches over the utility pipe or conduit.
  - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit.
  - 2. Coordinate backfilling with utilities testing.
- G. Backfill voids with satisfactory soil while installing and removing shoring and bracing.



- H. Place and compact final backfill of satisfactory soil, in accordance with requirements for Backfill as indicated above, to final subgrade elevation.
- I. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.
- J. Place backfill on subgrades free of mud, frost, snow, or ice.
- K. Comply with the requirements indicated in the paragraph below titled "Compaction of Soil Backfills and Fills".

### 3.13 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
  - 1. Make arrangements for required testing by Geotechnical Testing Agency as required. Do not place subsequent layers until required testing is complete and acceptable results have been obtained and documented.
  - 2. Under grass and planted areas, use satisfactory soil material.
  - 3. Under walks and pavements, use satisfactory soil material.
  - 4. Under steps and ramps, use satisfactory soil material.
  - 5. Under building slabs, use satisfactory soil material.
  - 6. Under footings and foundations, use [drainage course] [satisfactory soil material].
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.
- D. Do not place soil fill on yielding or unapproved subgrade.

### 3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 3 percent of optimum moisture content.
  - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry density.

### 3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
  - 1. Make arrangements for required testing by Geotechnical Testing Agency as required. Do not place subsequent layers until required testing is complete and acceptable results have been obtained and documented.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry density according to ASTM D 698.
  - 1. Under structures, building slabs, steps, and pavements, compact each layer of backfill or fill soil material at 98 percent.
  - 2. Under walkways, compact each layer of backfill or fill soil material at 95 percent.
  - 3. Under lawn or unpaved areas, compact each layer of backfill or fill soil material at 85 percent.
  - 4. For utility trenches under lawns or unpaved areas, compact each layer of initial and final backfill soil material at 85 percent. For all other areas compact to the level required for that area.
  - 5. For porous pavements, compact each layer of backfill or fill soil material to the level specified by the Architect, based on the recommendations of the Geotechnical Testing Agency. Generally, this level will be that required to provide a level of permeability and stability that is equivalent to the original, undisturbed subgrade soil.

### 3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
  - 2. Walks and Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBSURFACE DRAINAGE

- A. Subsurface Drainage (if applicable): Specified in Section titled "Subdrainage."
- B. Make arrangements for evaluation of subsurface drainage requirements by Geotechnical Testing Agency as required.
- C. If Architect, based on the recommendations of the Geotechnical Testing Agency, determines that subsurface drainage requirements differ from those indicated in the Contract Documents, install revised subsurface drainage as directed.
- D. Authorized adjustments of Subsurface Drainage will be paid for according to Contract provisions for unit prices. If Contract does not provide unit prices for Subsurface Drainage, adjustment will be based on mutually acceptable pricing established prior to the initiation of the Work.

3.18 GRADED AGGREGATE BASE COURSE (GABC)

- A. Place GABC on subgrades free of mud, frost, snow, or ice.
- B. Immediately prior to placing GABC, proof-roll subgrade as directed in the "Subgrade Inspection" paragraph above. Do not proceed with placement of GABC until subgrade is approved.
- C. On prepared and approved subgrade, place GABC under pavements as follows:
  - 1. Make arrangements for required testing by Geotechnical Testing Agency.
  - 2. Where indicated, install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  - 3. Place GABC material over subgrade under pavements as indicated.
  - 4. Shape GABC to required crown elevations and cross-slope grades.
  - 5. Place GABC 8 inches or less in compacted thickness in a single layer.
  - 6. Place GABC that exceeds 8 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 8 inches thick or less than 4 inches thick.
    - a. Do not place subsequent layers until required testing is complete and acceptable results have been obtained and documented.
  - 7. Compact GABC at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry density according to ASTM D 1557.
- D. Shoulders: Where installation is not bordered by concrete curb, walks or alternate confinement system, place shoulders along edges of GABC to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each base layer to not less than 95 percent of maximum dry density according to ASTM D 698.

3.19 COURSE AGGREGATE BASE COURSE (CABC)

- A. Place CABC on subgrades free of mud, frost, snow, or ice.
- B. Immediately prior to placing CABC, proof-roll subgrade as directed in the "Subgrade Inspection" paragraph above. Do not proceed with placement of CABC until subgrade is approved.
- C. On prepared and approved subgrade, place CABC under pavements as follows:
  - 1. Make arrangements for observation of consolidation efforts by Geotechnical Testing Agency.
  - 2. Where indicated, install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  - 3. Place CABC material over subgrade under pavements as indicated.
  - 4. Shape CABC to required crown elevations and cross-slope grades.
  - 5. Place CABC 8 inches or less in consolidated thickness in a single layer.
  - 6. Place CABC that exceeds 8 inches in consolidated thickness in layers of equal thickness, with no consolidated layer more than 8 inches thick or less than 4 inches thick.
    - a. Do not place subsequent layers until Geotechnical Testing Agency has been provided an opportunity to observe previous layer and acceptable results have been obtained and documented.
  - 7. Consolidate each layer of CABC with vibratory roller or plate compactor until aggregate appears to be completely consolidated with no additional settlement or consolidation is apparent during a final pass.
  - 8. Protect CABC from displacement by traffic until subsequent layer or pavement course is installed. Where CABC is displaced, re-consolidate before placement of subsequent layers or pavement course.
- D. Shoulders: Where installation is not bordered by concrete curb, walks or alternate confinement system, place shoulders along edges of CABC to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each base layer to not less than 95 percent of maximum dry density according to ASTM D 698.

3.20 AGGREGATE CHOKER COURSE (ACC)

- A. Place ACC on prepared base course that is free of mud, frost, snow, or ice.
  - 1. Do not place ACC on base course that has been subjected to surface contamination by sedimentation from adjoining grounds or vehicular traffic, even if the surface contamination has been removed, until sediment infiltration into the base has been corrected and approved by the Geotechnical Testing Agency.
- B. Immediately prior to placing ACC, obtain approval of base course by Geotechnical Testing Agency. Do not proceed with placement of ACC until base course is approved.

- C. On prepared and approved base course, place ACC under pavements as follows:
1. Make arrangements for observation of consolidation efforts by Geotechnical Testing Agency.
  2. Place ACC material over base course under pavements as indicated.
  3. Shape ACC to required crown elevations and cross-slope grades.
  4. Place ACC 8 inches or less in consolidated thickness in a single layer.
  5. Place ACC that exceeds 8 inches in consolidated thickness in layers of equal thickness, with no consolidated layer more than 8 inches thick or less than 4 inches thick.
    - a. Do not place subsequent layers until Geotechnical Testing Agency has been provided an opportunity to observe previous layer and acceptable results have been obtained and documented.
  6. Consolidate each layer of ACC with vibratory roller or plate compactor until aggregate appears to be completely consolidated with no additional settlement or consolidation is apparent during a final pass.
  7. Protect ACC from displacement by traffic until subsequent layer or pavement course is installed. Where ACC is displaced, re-consolidate before placement of subsequent layers or pavement course.
- D. Shoulders: Where installation is not bordered by concrete curb, walks or alternate confinement system, place shoulders along edges of ACC to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each base layer to not less than 95 percent of maximum dry density according to ASTM D 698.

### 3.21 SANDY GRAVEL BASE COURSE (SGBC)

- A. Place SGBC on subgrades free of mud, frost, snow, or ice.
- B. Immediately prior to placing SGBC, proof-roll subgrade as directed in the "Subgrade Inspection" paragraph above. Do not proceed with placement of SGBC until subgrade is approved.
- C. On prepared and approved subgrade, place SGBC under pavements as follows:
1. Make arrangements for required testing by Geotechnical Testing Agency.
  2. Where indicated, install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  3. Place SGBC material over subgrade under pavements as indicated.
  4. Shape SGBC to required crown elevations and cross-slope grades.
  5. Place SGBC 8 inches or less in compacted thickness in a single layer.
  6. Place SGBC that exceeds 8 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 8 inches thick or less than 4 inches thick.
    - a. Do not place subsequent layers until required testing is complete and acceptable results have been obtained and documented.

7. Compact SGBC at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry density according to ASTM D 1557.

- D. Shoulders: Where installation is not bordered by concrete curb, walks or alternate confinement system, place shoulders along edges of SGBC to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each base layer to not less than 95 percent of maximum dry density according to ASTM D 698.

### 3.22 RECYCLED PORTLAND CEMENT CONCRETE BASE COURSE (RPCCBC)

- A. Do not place RPCCBC until it has been tested and certified by a qualified Geotechnical Testing Agency.
- B. Place RPCCBC on subgrades free of mud, frost, snow, or ice.
- C. Immediately prior to placing RPCCBC, proof-roll subgrade as directed in the "Subgrade Inspection" paragraph above. Do not proceed with placement of RPCCBC until subgrade is approved.
- D. On prepared and approved subgrade, place RPCCBC under pavements as follows:
  1. Make arrangements for required testing by Geotechnical Testing Agency.
  2. Where indicated, install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  3. Place RPCCBC material over subgrade under pavements as indicated.
  4. Shape RPCCBC to required crown elevations and cross-slope grades.
  5. Place RPCCBC 8 inches or less in compacted thickness in a single layer.
  6. Place RPCCBC that exceeds 8 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 8 inches thick or less than 4 inches thick.
    - a. Do not place subsequent layers until required testing is complete and acceptable results have been obtained and documented.
  7. Compact RPCCBC at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 100 percent of maximum dry density according to ASTM D 1557.
- E. Shoulders: Where installation is not bordered by concrete curb, walks or alternate confinement system, place shoulders along edges of RPCCBC to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each base layer to not less than 95 percent of maximum dry density according to ASTM D 698

### 3.23 DRAINAGE COURSE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.

- B. Immediately prior to placing drainage course, proof-roll subgrade as directed in the "Subgrade Inspection" paragraph above. Do not proceed with placement of GABC until subgrade is approved.
- C. On prepared and approved subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
  - 1. Make arrangements for observation of consolidation efforts by Geotechnical Testing Agency.
  - 2. Where indicated, install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  - 3. Place drainage course 6 inches or less in consolidated thickness in a single layer.
  - 4. Place drainage course that exceeds 6 inches in consolidated thickness in layers of equal thickness, with no consolidated layer more than 6 inches thick or less than 3 inches thick.
  - 5. Consolidate each layer of drainage course with vibratory roller or plate compactor until aggregate appears to be completely consolidated and no additional settlement or consolidation is apparent during a final pass.
  - 6. Protect drainage course from displacement by traffic until subsequent layer or pavement course is installed. Where drainage course is displaced, re-consolidate before placement of subsequent layers or slab-on-grade.
- D. Shoulders: Where installation is not bordered by concrete foundation walls or alternate confinement system, place shoulders along edges of drainage course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each drainage course layer to not less than 95 percent of maximum dry density according to ASTM D 698.

### 3.24 FIELD QUALITY CONTROL

- A. Geotechnical Testing Agency: Contractual responsibilities for testing are identified in Division 1 Section "Quality Requirements". Responsible party will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare test reports in accordance with requirements of International Building Code Chapter 1704.7.
  - 1. Soils: Verify site preparation complies with approved soils report.
  - 2. Placement and Compaction: Verify placement and compaction of fill materials comply with approved soils report.
  - 3. Dry-Density: Verify dry-density of compacted fill complies with approved soils report.

- C. Allow Geotechnical Testing Agency to inspect and test subgrades, each fill or backfill layer, and each base course layer as applicable. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect, based on the recommendations of the Geotechnical Testing Agency.
- E. Geotechnical Testing Agency will test compaction of soils and base course in place according to D2937 or ASTM D 2922 as applicable, except for locations within areas of SCDOT jurisdiction which shall be tested according to applicable SCDOT procedures and rates.
  - 1. Unless otherwise indicated or required by SCDOT or other authorities having jurisdiction, tests will be performed at the following locations and frequencies:
    - a. Paved and Building Slab Areas: At subgrade, each compacted fill and backfill layer, and each base course layer, at least 1 test for every 5000 sq. ft or less of paved area or building slab, but in no case fewer than 3 tests.
    - b. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
    - c. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 300 feet or less of trench length, but no fewer than 2 tests.
- F. When Geotechnical Testing Agency reports that subgrades, fills, backfills, or base course have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace to depth required; recompact and retest until specified compaction is obtained.

### 3.25 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.



- D. Protect CABC, ACC, and SGBC installations from deposition of sediments from adjoining grounds and vehicular traffic.
  - 1. Install and maintain erosion control measures as necessary, at boundaries of installations, to prevent migration of sediment onto the base course surface.
  - 2. Erect and maintain barricades to prevent construction traffic on the base course surface.
  - 3. Do not allow tracking of mud or debris onto the pavement surface by any vehicle.
  - 4. If deposition of sediment on the base course surface is noted, immediately contact Architect and request instructions for cleaning and repair. Do not delay cleaning efforts as subsequent rainfall events will wash sediments into lower levels of the base course and worsen potential damage.
  - 5. Do not use CABC, ACC, or SGBC installations as construction access roads without prior approval of Architect. If approval is received, implement, monitor, and maintain any specified protection measures.

### 3.26 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Unless directed to stockpile onsite, remove surplus satisfactory and unsatisfactory soil and legally dispose of it off Owner's property. Remove waste material, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 312000

## SECTION 329300 - PLANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Plants.
  - 2. Planting soil and amendments
  - 3. Tree stabilization.
  - 4. Landscape edgings.
  - 5. Mulch.
  - 6. Maintenance.

#### 1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

- F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- H. Finish Grade: Elevation of finished surface of planting soil.
- I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- L. Planting Area: Areas to be planted.
- M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- R. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.
- S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, including soils.
  - 1. Plant Materials: Include quantities, sizes, and quality for plant materials.
  - 2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
- B. Samples for Verification: For each of the following:
  - 1. Trees and Shrubs: Three samples of each variety and size. Maintain approved samples on-site as a standard for comparison.
  - 2. Organic/Compost Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
  - 3. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.
  - 4. Root Barrier: Width of panel by 12 inches.
- C. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
  - 1. Manufacturer's certified analysis of standard products.
  - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- D. Material Test Reports: Soil Analysis Report.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.
- F. Warranty: Sample of special warranty.
- G. Minutes of preinstallation conference.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.
- B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
  - 1. Report suitability of tested soil for plant growth.
    - a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    - b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
- E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
- F. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
- G. Preinstallation Conference: Conduct conference at Project site.
- H. Authorities Having Jurisdiction: Conform to requirements of all authorities having jurisdiction.
  - 1. Where conflicts exist between the requirements of the Contract Documents and those of authorities having jurisdiction, the higher quality or more restrictive requirement shall apply.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
- B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
  2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
  3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.
- C. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.
- D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- E. Handle planting stock by root ball.
- F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.
- G. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
  2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
  3. Do not remove container-grown stock from containers before time of planting.
  4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

## 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
1. Notify Owner no fewer than two days in advance of proposed interruption of each service or utility.
  2. Do not proceed with interruption of services or utilities without Owner's written permission.

- B. Planting Restrictions: Coordinate planting periods with maintenance periods to provide required maintenance from time of planting through required warranty period.
- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- D. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
  - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

## 1.8 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
    - b. Structural failures including plantings falling or blowing over.
    - c. Faulty performance.
    - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Periods from Date of Final Completion:
    - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
    - b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
    - c. Annuals: Three months.
  - 3. Include the following remedial actions as a minimum:
    - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
    - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
    - c. Provide extended warranty for period equal to original warranty period, for replaced plant material

## 1.9 MAINTENANCE SERVICE

- A. Maintenance Service for Plants: Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until date of Final Completion.

## PART 2 - PRODUCTS

### 2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
  - 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
  - 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

### 2.2 INORGANIC SOIL AMENDMENTS

- A. Provide inorganic soil amendments in quantities and proportions recommended by soil analysis report.

### 2.3 ORGANIC SOIL AMENDMENTS

- A. Provide organic soil amendments in quantities and proportions recommended by soil analysis report.

### 2.4 FERTILIZERS

- A. Provide fertilizers in quantities and proportions recommended by soil analysis report.



## 2.5 PLANTING SOILS

- A. At Contractor's option, provide one or more of the following planting soils. All soils used for planting shall be prepared as necessary using soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce satisfactory planting soil suitable for healthy, viable plants.
1. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil with soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce planting soil.
  2. Planting Soil: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
    - a. Supplement with another specified planting soil when quantities are insufficient.
    - b. Mix existing, native surface topsoil with soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce planting soil.
  3. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce planting soil.
  4. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs, or marshes.
    - a. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

- b. Mix imported topsoil or manufactured topsoil with soil amendments and fertilizers in the quantities recommended in the soil analysis report to produce planting soil.

## 2.6 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
  1. Type: as indicated on Plant Schedule.
  2. Size Range for chipped or shredded mulch (where applicable): 3 inches maximum, 1/2 inch minimum.
  3. Color: Natural.

## 2.7 PESTICIDES AND HERBICIDES

- A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

## 2.8 TREE STABILIZATION MATERIALS

- A. Stakes and Guys:
  1. Upright and Guy Stakes: Rough-sawn, sound, new wood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
  2. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.
  3. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
    - a. Products: Subject to compliance with requirements and approval of Architect.
  4. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.
  5. Proprietary Staking Devices: Proprietary stake and adjustable tie systems to secure each new planting by plant stem; sized as indicated and per manufacturer's written recommendations.

- a. Products: Subject to compliance with requirements and approval of Architect.
- B. Root-Ball Stabilization Materials:
1. Proprietary Root-Ball Stabilization Devices: Proprietary at- or below-grade stabilization systems to secure each new planting by root ball; sized per manufacturer's written recommendations unless otherwise indicated.
    - a. Products: Subject to compliance with requirements and approval of Architect.
- C. Palm Bracing: Battens or blocks, struts, straps, and protective padding as indicated.
1. Proprietary Palm-Bracing Devices: Proprietary systems to secure each new planting by trunk; sized per manufacturer's written recommendations unless otherwise indicated.
  2. Products: Subject to compliance with requirements and approval of Architect.

## 2.9 LANDSCAPE EDGINGS

- A. Steel Edging: Standard commercial-steel edging, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
1. Manufacturers: Subject to compliance with requirements and approval of Architect.
  2. Edging Size: 3/16 inch wide by 4 inches deep.
  3. Stakes: Tapered steel, a minimum of 15 inches long.
  4. Accessories: Standard tapered ends, corners, and splicers.
  5. Finish: Enamel paint.
  6. Paint Color: as specified by Architect from manufacturer's full range.

## 2.10 MISCELLANEOUS PRODUCTS

- A. Wood Pressure-Preservative Treatment: AWPAC2, with waterborne preservative for soil and freshwater use, acceptable to authorities having jurisdiction, and containing no arsenic; including ammoniacal copper arsenate, ammoniacal copper zinc arsenate, and chromated copper arsenate.
- B. Root Barrier: Black, molded, modular panels manufactured with 50 percent recycled polyethylene plastic with ultraviolet inhibitors, 85 mils thick, with vertical root deflecting ribs protruding 3/4 inch out from panel, and each panel 18 inches wide.
- C. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

- D. Burlap: Non-synthetic, biodegradable.
- E. Planter Drainage Gravel: Naturally or artificially graded mixture of crushed gravel or stone, in accordance with the gradation requirements for Coarse Aggregate #789 as defined by the South Carolina Department of Transportation Standard Specifications for Highway Construction.
  - 1. Material shall be free of shale, clay, friable material, debris, waste, frozen materials, vegetation, organic material, or other deleterious matter.
- F. Planter Filter Fabric: Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.
- G. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
  - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
  - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
  - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

### 3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

- B. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

### 3.3 PLANTING AREA ESTABLISHMENT

- A. Loosen subgrade of planting areas to a minimum depth of 8 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them.
  - 1. Apply fertilizer and soil amendments after fine grading and mix thoroughly into upper 2 inches of soil.
  - 2. Fertilizer and other necessary soil amendments shall be applied at the rate recommended by the soil analysis.
- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

### 3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 60-degree angle. Excavations with vertical sides shall be avoided. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling.
  - 1. Excavate approximately three times as wide as root ball diameter.
  - 2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
  - 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
  - 4. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
  - 5. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
- B. Subsoil and topsoil removed from excavations may be used as planting soil for individually planted trees that are not located within a prepared plant bed.
- C. Obstructions: Notify Owner if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

### 3.5 TREE, SHRUB, AND VINE PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.
  - 1. Use excavated soil for backfill.
  - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
  - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
  - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Set container-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
  - 1. Use excavated soil for backfill.
  - 2. Carefully remove root ball from container without damaging root ball or plant.
  - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
  - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.

- E. Set fabric bag-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
  - 1. Use excavated soil for backfill.
  - 2. Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
  - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
  - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
  - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
  
- F. Set and support bare-root stock in center of planting pit or trench with root flare 2 inches above adjacent finish grade.
  - 1. Use excavated soil for backfill.
  - 2. Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand. Puddle with water until backfill layers are completely saturated. Plumb before backfilling, and maintain plumb while working backfill around roots and placing layers above roots.
  - 3. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside soil-covered roots about 1 inch from root tips; do not place tablets in bottom of the hole or touching the roots.
  - 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
  
- G. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

### 3.6 TREE, SHRUB, AND VINE PRUNING

- A. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
  
- B. Do not apply pruning paint to wounds.

### 3.7 TREE STABILIZATION

- A. Install trunk stabilization staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.
- B. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated according to manufacturer's written instructions.

### 3.8 GROUND COVER PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.
- B. Use planting soil <Insert drawing designation> for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.
- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

### 3.9 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
  - 1. Trees and Tree-like Shrubs in Turf Areas: Apply mulch ring of 3-inch average thickness, with 30-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks.
  - 2. Mulch in Planting Areas: Apply 3-inch average thickness of mulch as indicated on Drawings. Extend at least 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

### 3.10 EDGING INSTALLATION

- A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions.



- B. Shovel-Cut Edging: Separate mulched areas from turf areas with a 45-degree, 4- to 6-inch- deep, shovel-cut edge as shown on Drawings.

### 3.11 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

### 3.12 PESTICIDE AND HERBICIDE APPLICATION

- A. Do not use pesticides or herbicides.
- B. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- C. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.
- D. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

### 3.13 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.14 DISPOSAL

- A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them.

END OF SECTION 329300

## SECTION 32 31 16 - WELDED WIRE SCREENS AND GATES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Metallic-coated-steel, welded-wire screens.
  - 2. Swing gates, including hardware.

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product required to complete the Work as described.
- B. Shop Drawings: For screens and gates.
  - 1. Include plans, elevations, sections, anchoring and attachment details.
- C. Samples: For each fence material and for each color specified.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

#### 1.5 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of welded wire screens and gates that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Wind Loading: Comply with ASCE/SEI 7 requirements for fence height, wind exposure category, design wind speed, and design wind pressure.
  - 1. Design Wind Load: As indicated on Drawings.
- B. Lightning-Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

## 2.2 METALLIC-COATED-STEEL, WELDED-WIRE SCREENS

- A. Metallic-Coated-Steel, Welded-Wire Screens and Gates:
- B. Screen Fabric: Metallic-coated-steel wire.
  - 1. Spacing of Vertical Wires: 3/4 inch.
  - 2. Vertical and Horizontal Wire Size: 0.187 inch.
  - 3. Spacing of Horizontal Wires: 3/4 inch.
- C. Screen/Fence and Gate Frames: Square tubes, 2 by 3 inches formed from 0.108-inch nominal-thickness, metallic-coated steel sheet.
  - 1. Factory miter all corners.
- D. Screen Posts:
  - 1. Line, End and Corner Posts: Square tubes, 3 by 3 inches formed from 0.108-inch nominal-thickness, metallic-coated steel sheet.
- E. Post Caps: Formed from steel sheet and hot-dip galvanized after forming.
- F. Finish: Organic coating complying with requirements in ASTM F2408.

## 2.3 SWING GATES

- A. Galvanized-Steel Frames and Bracing: Fabricate members from square tubes 2 by 3 inches formed from 0.108-inch nominal-thickness, metallic-coated steel sheet hot-dip galvanized after fabrication.
- B. Infill: Welded-wire fence fabric matching adjacent fence.
- C. Hardware: Hardware shall permit operation from both sides of gate.
  - 1. Heavy Duty strap hinges as indicated in the drawings.
  - 2. Latches with a keyed locking mechanism and mortised strike.
  - 3. Hardware finish to match Gate and screen frames.
- D. Metallic-Coated-Steel Finish: High-performance coating.

## 2.4 FENCE AND GATE MATERIALS

- A. Metallic-Coated-Steel Wire: Welded-wire fence fabric, hot-dip galvanized after fabrication. Weight of zinc coating shall be not less than 1.0 oz./sq. ft..
- B. Metallic-Coated Steel Sheet: Galvanized-steel sheet or aluminum-zinc, alloy-coated steel sheet.
- C. Galvanizing: For components indicated to be galvanized and for which galvanized coating is unspecified, hot-dip galvanize to comply with ASTM A123/A123M. For hardware items, hot-dip galvanize to comply with ASTM A153/A153M.

## 2.5 METALLIC-COATED-STEEL FINISHES

- A. High-Performance Coating: Apply zinc-rich epoxy primer, epoxy paint intermediate coat, and polyurethane topcoat to prepared surfaces. Apply at spreading rates recommended by coating manufacturer.
  - 1. Match approved Samples for color, texture, and coverage. Remove and refinish, or recoat work that does not comply with specified requirements.

## PART 3 - EXECUTION

### 3.1 SCREEN INSTALLATION

- A. Install screens according to manufacturer's written instructions.
- B. Install screens by setting posts as indicated and fastening to posts. Peen threads of bolts after assembly to prevent removal.
- C. Post Setting: Set posts in concrete with mechanical anchors at indicated spacing into firm, undisturbed soil.
  - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
  - 2. Posts Set in Concrete: Extend post to within 6 inches of specified excavation depth, but not closer than 3 inches to bottom of concrete.
  - 3. Space posts as indicated in the drawings.

### 3.2 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

**END OF SECTION**

# DRAFT AIA® Document A701® – 2018

## Instructions to Bidders

for the following Project:

(Name, location, and detailed description)

«[Seneca Amphitheater](#) »  
«[Seneca, South Carolina](#) »  
«[Covered Stage and Amphitheater](#) »

### THE OWNER:

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

«[City of Seneca, South Carolina](#)»« »  
«[221 E. North 1<sup>st</sup> Street](#) »  
«[Seneca, SC 29678](#) »  
« »

### THE ARCHITECT:

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

«[McMillan Pazdan Smith Architecture](#) »« »  
«[400 Augusta St](#) »  
«[Suite 200](#) »  
«[Greenville, SC 29601](#) »

### TABLE OF ARTICLES

- 1 DEFINITIONS
- 2 BIDDER'S REPRESENTATIONS
- 3 BIDDING DOCUMENTS
- 4 BIDDING PROCEDURES
- 5 CONSIDERATION OF BIDS
- 6 POST-BID INFORMATION
- 7 PERFORMANCE BOND AND PAYMENT BOND
- 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

### ADDITIONS AND DELETIONS:

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

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

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

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

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## ARTICLE 1 DEFINITIONS

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

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

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

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

## ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

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

## ARTICLE 3 BIDDING DOCUMENTS

### § 3.1 Distribution

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

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

« »

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

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

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

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

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

### § 3.2 Modification or Interpretation of Bidding Documents

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

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

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

« »

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

### § 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

#### § 3.3.2 Substitution Process

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

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

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

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

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

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.



**§ 3.4 Addenda**

**§ 3.4.1** Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

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

« »

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

**§ 3.4.3** Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

**§ 3.4.4** Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

**ARTICLE 4 BIDDING PROCEDURES**

**§ 4.1 Preparation of Bids**

**§ 4.1.1** Bids shall be submitted on the forms included with or identified in the Bidding Documents.

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

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

**§ 4.1.4** Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

**§ 4.1.5** All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

**§ 4.1.6** Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

**§ 4.1.7** Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

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

**§ 4.2 Bid Security**

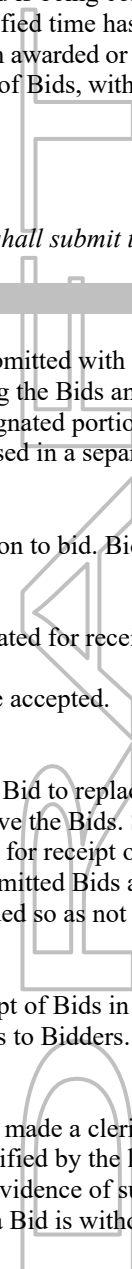
**§ 4.2.1** Each Bid shall be accompanied by the following bid security:

*(Insert the form and amount of bid security.)*

« »

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

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

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

### § 4.3 Submission of Bids

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

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

« »

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

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

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

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

### § 4.4 Modification or Withdrawal of Bid

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

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

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

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

« »

## ARTICLE 5 CONSIDERATION OF BIDS

### § 5.1 Opening of Bids

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

## § 5.2 Rejection of Bids

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

## § 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

## ARTICLE 6 POST-BID INFORMATION

### § 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

### § 6.2 Owner's Financial Capability

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

### § 6.3 Submittals

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

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

## ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

### § 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

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

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

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

« »

## § 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

## ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

- 1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.

*(Insert the complete AIA Document number, including year, and Document title.)*

« »

- 2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.

*(Insert the complete AIA Document number, including year, and Document title.)*

« »

- 3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.

*(Insert the complete AIA Document number, including year, and Document title.)*

« »

- 4 Building Information Modeling Exhibit, if completed:

« »

- 5 Drawings

**Number**

**Title**

**Date**

**.6** Specifications

Section	Title	Date	Pages

**.7** Addenda:

Number	Date	Pages

**.8** Other Exhibits:

*(Check all boxes that apply and include appropriate information identifying the exhibit where required.)*

AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:

*(Insert the date of the E204-2017.)*

The Sustainability Plan:

Title	Date	Pages

Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

**.9** Other documents listed below:

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

**DEPARTMENT OF COMMERCE  
GRANTS ADMINISTRATION**



**CONTRACT SPECIAL PROVISIONS  
Appalachian Regional Commission**

*The following ARC Contract Special Provisions should be used with all construction contracts and professional service contracts, where ARC funds are being used in whole or in part.*

## CONTRACT SPECIAL PROVISIONS

1. **Definitions:** For purposes of this Contract, the following terms shall have the meanings set forth below:
  - (a) “Assistance” means the grant funds provided, or to be provided, to the Grantee by the State, pursuant to the Grant Award Agreement.
  - (b) “ARC” means Appalachian Regional Commission.
  - (c) “CDBG” means Community Development Block Grant
  - (d) “Contract” means the contractual agreement between the Owner and the Contractor to which these Contract Special Provisions have been incorporated and made a part thereof.
  - (e) “Contractor” means the contractor whose services are retained pursuant to the Contract.
  - (f) “Grantee” means the unit of local government designated as the recipient of the Assistance in the Grant Award and signing the acceptance provision of the Grant Award.
  - (g) “HUD” means U.S. Department of Housing and Urban Development, which is the federal agency that awards and has authority over -CDBG funding to the State.
  - (h) “Owner” means the Grantee or Subrecipient, as applicable.
  - (i) “Project” means the project for which the services of the Contractor have been retained pursuant to the Contract which are funded, in whole or in part, with ARC funds.
  - (j) “State” means the State of South Carolina, or that agency, agency division, or Office of State government which has been delegated the responsibility for administering the ARC program for the State of South Carolina, as appropriate.
  - (k) “Subrecipient” means the agent of the unit of local government as designated by an agreement.
  - (l) “Labor Surplus Area” means a civil jurisdiction that has an unemployment rate at least 20% above the average unemployment rate for all states, the District of Columbia, and Puerto Rico during the previous two calendar years. The Department of Labor issues the labor surplus area list on a fiscal year basis.

2. **Prime Contractor Responsibilities:** The Contractor is required to assume sole responsibility for the complete effort and enforcement of laws and regulations under this Contract. The Owner will consider the Contractor to be the sole point of contact with regard to contractual matters. All contractors must be registered in SAM and eligible to receive federal contracts.
3. **Federal and State Laws:** The Contractor agrees to comply with all ARC and CDBG requirements as well as other federal and state laws, regulations, or Executive Orders. The State reserves the right to add or delete terms and conditions of this Contract as may be required by revisions and additions or changes in the requirements, regulations, and laws governing the ARC Program.
4. **Procurement and Contracting:** In accordance with 2 CFR Part 200, the cost plus a percentage of cost and percentage of construction cost methods of contracting shall not be used. This provision shall supersede any conflicting provision in an executed contract document or agreement funded in whole or in part with ARC funds.
5. **Build America, Buy America (BABA) – The Buy America Preference:** This domestic content for construction materials and procurement includes an article, material, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious material; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that is or consists primarily of: non-ferrous metals; plastic and polymer based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall.
  - (a) Domestic content procurement preference – the term “domestic” content procurement preference” means all iron and steel used in the project are produced in the United States; the manufactured products used in the project are produced in the United States; or the construction materials used in the project are produced in the United States.
6. **Ownership:** Ownership of all real or personal property, acquired in whole or in part with ARC funds for use on this Project, shall be vested in the Grantee, unless otherwise authorized by the State. When the Grantee determines that the property is no longer required for the purposes of this Project, the Grantee must notify the State and obtain approval for disposition of the property in accordance with applicable guidelines.
7. **Copyright:** Except as otherwise provided in the terms and conditions of this Contract, the Contractor paid through this Contract is free to copyright any books, publications or other copyrightable materials developed in the course of the Project and under this Contract. However, ARC and the State reserve a royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use and to authorize others to use, for Federal government and State purposes:
  - (a) the copyright in any work developed under this Contract; and
  - (b) any rights of copyright to which a subcontractor purchases ownership with grant support.

The Federal government's rights and the State's rights identified above must be conveyed to the publisher and the language of the publisher's release form must insure the preservation of these rights.



6. **Reporting Requirements:** The Contractor agrees to complete and submit all reports, in such form and according to such schedule, as may be required by the State or ARC. Further, the Contractor agrees to require any subcontractors to submit reports that may be required and to incorporate such language in its agreements. Failure to meet deadlines with the required information could result in sanctions.
7. **Access to Records:** All records with respect to all matters covered by this Contract shall be made available at any time for audit and inspection by ARC, the State or the Grantee or their representatives upon their request.
8. **Maintenance of Records:** Records for non-expendable property purchased totally or partially with Federal funds must be retained for five years after final close-out of the grant. All other pertinent contract records including financial records, supporting documents and statistical records shall be retained for a minimum of five years after the final close-out report. However, if any litigation, claim, or audit is started before the expiration of the five-year period, then records must be retained for five years after the litigation, claim or audit is resolved.
9. **Confidential Information:** Any reports, information, data, etc., given to, prepared by, or assembled by the Contractor under this Contract, which the Grantee or the State requests to be kept confidential, shall not be made available to any individual or organization by the Contractor without prior written approval of the Grantee or the State, as applicable.
10. **Reporting of Fraudulent Activity:** If at any time during the term of this Contract anyone has reason to believe by whatever means that, under this or any other program administered by the State, a recipient of funds has improperly or fraudulently applied for or received benefits, monies or services pursuant to this Contract or any other contract, such information shall be reported immediately to the appropriate authorities.
11. **Political Activity:** None of the funds, materials, property or services provided directly or indirectly under this Contract shall be used for any partisan political activity, or to further the election or defeat of any candidate for public office or otherwise in violation of the provisions of Section 8-13-765 of the Code of Laws of South Carolina, 1976, as amended.
12. **Conflicts of Interest and Ethical Standards, South Carolina Consolidated Procurement Code:** The following provisions regarding “conflicts of interest” apply to the use and expenditure of ARC funds by the Grantee and its subrecipients, including the Contractor.

In the procurement of supplies, equipment, construction and services, the more restrictive conflict of interest provisions of the State of South Carolina Ethics, Government Accountability and Campaign Reform Act of 1991 or of the Contractor shall apply.

In cases not governed by the above, such as the acquisition and disposition of real property and the provision of ARC assistance to individuals, businesses and other private entities, the following provisions shall apply.

Except for eligible administrative or personnel costs, the general rule is that no person who is an employee, agent, consultant, officer, or elected or appointed official of the State or a unit of general local government or any designated public agencies or subrecipient which are receiving ARC funds who exercise or have exercised any function or responsibilities

with respect to ARC activities assisted herein or are in a position to participate in a decision making process or gain inside information with regard to such activities, may obtain a financial interest or benefit from the activity, or have an interest in any contract, subcontract or agreement with respect thereto, or the proceeds thereunder either for themselves or those with whom they have family or business ties during their tenure or for one year thereafter. Exceptions may be granted by the State on a case by case basis as requested upon full disclosure in writing.

Should any governmental entity, contractor, subcontractor, employee or official know or perceive any breach of ethical standards or conflict of interest under the ARC grant awarded to the Grantee or any other ARC grant, they shall immediately notify in writing the Department of Commerce, Grants Administration, 1201 Main Street, Suite 1600, Columbia, South Carolina, 29201. If the State finds any circumstances that may give rise to a breach of ethical standards or conflict of interest, under any grant, they shall notify the participating governmental entity and the State Ethics Commission as appropriate. The State may undertake any administrative remedies it deems appropriate, where there is a breach of ethical standards or conflict of interest under the regulations governing the ARC Program and the State policies.

13. **Applicable Law:** In addition to the applicable Federal laws and regulations, this Contract is also made under and shall be construed in accordance with the laws of the State. By execution of this Contract, the Contractor agrees to submit to the jurisdiction of the State for all matters arising or to arise hereunder, including but not limited to performance of said Contract and payment of all licenses and taxes of whatever kind or nature applicable hereto.
14. **Limitation of Liability:** The Contractor will not assert in any legal action by claim or defense, or take the position in any administrative or legal procedures that he is an agent or employee of the Owner. This provision is not applicable to contracts for ARC administration services where the Contractor is a Council of Government. The State shall not be liable for failure on the part of the Grantee or any other party to perform all work in accordance with all applicable laws and regulations. The Grantee agrees to defend, indemnify, and hold harmless the State from and against all claims, demands, judgments, damages, actions, causes of actions, injuries, administrative orders, consent agreement and orders, liabilities, penalties, costs, and expenses of any kind whatsoever, including, without limitation, claims arising out of loss of life, injury to persons, property, or business or damage to natural resources in connection with the activities of the Grantee and any other third parties in a contractual relationship with the Grantee, or a subsidiary, whether or not occasioned wholly or in part by any condition, accident, or event caused by any act or omission of the State as a result of the Assistance.
15. **Legal Services:** No attorney-at-law shall be engaged through the use of any funds provided under this Contract in any legal action or proceeding against the State, the Grantee, any local public body or any political subdivision.
16. **Contract:** If any provision in this Contract shall be held to be invalid or unenforceable, the remaining portions shall remain in effect. In the event such invalid or unenforceable provision is considered an essential element of this Contract, the parties shall promptly negotiate a replacement provision, which addresses the intent of such provision.

17. **Amendments:** Any changes to this Contract affecting the scope of work of the Project must be approved, in writing, by the Owner and the Contractor and shall be incorporated in writing into this Contract. Any amendments of the original contract must have written approval by the State prior to execution.
18. **Termination for Convenience:** This Contract may be terminated for convenience in accordance with 2 CFR Part 200.
19. **Sanctions:** If the Contractor fails or refuses to comply with the provisions set forth herein, the State or Owner may take any or all of the following actions: cancel, terminate or suspend in whole or in any part the contract, or refrain from extending any further funds to the Contractor until such time as the Contractor is in full compliance.
20. **Subcontracting:** If any part of the work covered by this Contract is to be subcontracted, the Contractor shall identify the subcontracting organization and the contractual arrangements made therewith to the Owner and to the State. All subcontracts must be approved by the Owner and the State to insure they are not debarred or suspended by the Federal or State governments and to insure the Owner and the State understand the arrangements.
21. **Subcontracting with Small and Minority Firms, Women's Business Enterprise and Labor Surplus Areas:** It is national policy to award a fair share of contracts to disadvantaged business enterprises (DBEs), small business enterprises (SBEs), minority business enterprises (MBEs) and women's business enterprises (WBEs). Accordingly, affirmative steps must be taken to assure that DBEs, SBEs, MBEs and WBEs are utilized when possible as sources of supplies, equipment, construction and services. Affirmative steps shall include the following:
- (a) Including qualified DBEs, SBEs, MBEs and WBEs on solicitation lists;
  - (b) Assuring that DBEs, SBEs, MBEs and WBEs are solicited whenever they are potential sources;
  - (c) Whenever economically feasible, dividing total requirements into smaller tasks or quantities so as to permit maximum participation by DBEs, SBEs, MBEs and WBEs;
  - (d) Where the requirement permits, establishing delivery schedules which will encourage participation by DBEs, SBEs, MBEs and WBEs;
  - (e) Using the services and assistance of the Small Business Administration, Minority Business Development Agency, the State Office of Small and Minority Business Assistance, the U.S. Department of Commerce and the Community Services Administration as required; and
  - (f) Requiring the subcontractor, if any, to take the affirmative actions outlined in (1) – (5) above.
22. **Debarment Certification:** The Contractor must comply with Executive Order 11246 regarding Federal debarment and suspension regulations prior to entering into a financial agreement for any transaction as outlined below.
- (a) Any procurement contract for goods and services, regardless of type, expected to equal or exceed the Federal procurement small purchase threshold (which is \$100,000 and is cumulative amount from all federal funding sources).

(b) Any procurement contract for goods and services, regardless of amount, under which the Contractor will have a critical influence on or substantive control over the transaction.

In addition, no contract may be awarded to any contractors who are ineligible to receive contracts under any applicable regulations of the State.

**23. South Carolina Illegal Immigration Reform Act:** The Owner and the Contractor are required to comply with the South Carolina Illegal Immigration Reform Act (signed June 4, 2008) requiring verification of lawful presence in the United States of any alien eighteen years of age or older who has applied for state or local public benefits, as defined in 8 U.S.C. Section 1621, or for federal public benefits, as defined in U.S.C. Section 1611.

**24. Equal Employment Opportunity:** The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the State.

In carrying out the Project, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor must take affirmative action to insure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the State setting forth the provisions of this non-discrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. The Contractor will, in all solicitations or advertisements for employees by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin. The Contractor shall incorporate the foregoing requirements of this paragraph in all of its subcontracts for the Project unless exempted by rules, regulations, or orders of the State issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor.

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

The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the State, or pursuant thereto, and will permit access to its books, records, and accounts by ARC and the State for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

In the event of the Contractor's noncompliance with the non-discrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further State government contracts or federally assisted construction contract procedures

authorized in Executive Order 11246 of September 24, 1965, or by rules, regulations, or orders of the State, or as otherwise provided by law.

- 25. Age Discrimination:** In accordance with 45 CFR, Parts 90 and 91, the Contractor agrees there shall be no bias or age discrimination as to benefits and participation under this Contract.
- 26. Section 504 of the Rehabilitation Act of 1973, as amended:** The Contractor agrees that no otherwise qualified individual with disabilities shall, solely by reason of his disability, be denied the benefits, or be subjected to discrimination including discrimination in employment, any program or activity that receives the benefits from the Assistance.
- 27. Compliance with Air and Water Acts:** (Applicable to construction contracts and related subcontracts exceeding \$100,000) This Contract is subject to the requirements of the Clean Air Act, as amended, 42 USC § 7401 et seq., the Federal Water Pollution Control Act (Clean Water Act), as amended, 33 USC § 1251 et seq., and the regulations of the Environmental Protection Agency with respect to 40 CFR Part 15, as amended from time to time, and the South Carolina Stormwater Management and Sediment Reduction Act. In particular, the following are required:
- (a) A stipulation by the Contractor or subcontractor that any facility to be utilized in the performance of any nonexempt contract or subcontract is not listed on the List of Violating Facilities, issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR § 15.20.
  - (b) Agreement by the Contractor to comply with all the requirements of Section 114 of the Clean Air Act, as amended (42 USC § 7414) and Section 308 of the Federal Water Pollution Control Act, as amended (33 USC § 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Sections 114 and 308, and all regulations and guidelines issued thereunder.
  - (c) A stipulation that as a condition of award of contract prompt notice will be given of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized or to be utilized for the contract under consideration is to be listed on the EPA list of Violating Facilities.
  - (d) Agreement by the Contractor that the Contractor will include or cause to be included the criteria and requirements in these subparagraphs (1) through (4), in every nonexempt subcontract and requiring that the Contractor will take such action as the State may direct as a means of enforcing such provisions.

In no event shall any amount of the Assistance be utilized with respect to a facility which has given rise to a conviction under section 113(c)(1) of the Clean Air Act or Section 309(c) of the Federal Water Pollution Control Act.

- 28. Federal Labor Standards Provisions:** (*Applicable to construction contracts in excess of \$2,000 or residential rehabilitation contracts involving more than eight units*)

The Project or program to which the construction work covered by this Contract pertains is being assisted by the United States of America and the Federal Labor Standards Provisions as set forth on Attachment 1 are included in this Contract pursuant to the provisions applicable to such Federal assistance. These provisions must be complied with or sanctions will be instituted.

## Attachment 1

U.S. Department of Housing and Urban Development, Office of Labor Relations form HUD-4010 (06/2009) ref. Handbook 1344.1

**A. 1. (i) Minimum Wages.** All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached thereto and made a part thereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5 (a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification of the time actually work therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification an wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

**(ii) (a)** Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1)** The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2)** The classification is utilized in the area by the construction industry; and
- (3)** The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

**(b)** If the contractor and the laborers and mechanics to be employed I the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so

advise HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**(c)** In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1214-0140.)

**(d)** The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

**(iii)** Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

**(iv)** If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account asset for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

**2. Withholding.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federal-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension or any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for an on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

**3. (i) Payrolls and basic records.** Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three

years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1 (b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment of provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices and trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

**(ii) (a)** the contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget Under OMB Control Number 1215-0129.)

**(b)** Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays for supervises the payment of the persons employed under the contract and shall certify the following:

**(1)** That the payroll for the payroll period contains the information required to be maintained under 29 CFR 5.5 (a)(3)(i) and that such information is correct and complete’

**(2)** That each laborer or mechanic (including each apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

**(3)** That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

**(c)** The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by subparagraph A.3. (ii)(b).



**(d)** The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

**(iii)** The contractor or subcontractor shall make the records required under subparagraph A.3. (i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### **4. Apprentices and Trainees.**

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment Training Administration, Office of Apprenticeship Training, Employer and Training Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen in any craft classification shall not be greater than the ratio permitted to the contractor as to his entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as state above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ration permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved

**(ii) Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every Trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

**(iii) Equal employment opportunity.** The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

**6. Subcontracts.** The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 of this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

**7. Contract termination; debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act Requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

**9. Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause

include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

**10. (i) Certification of Eligibility.** By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(ii)** No part of this contract shall be subcontracted to any person or firm ineligible for award of a government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

**(iii)** The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provided in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration . . . makes, utters or publishes any statement knowing the same to be false . . . shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

**11. Complaints, Proceedings, or Testimony by Employees.** No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

**B. Contract Work Hours and Safety Standards Act.** The provisions of this paragraph B are applicable only where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

**(1) Overtime Requirements.** No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**(2) Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violations of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

**(3) Withholding for unpaid wages and liquidated damages.** HUD or its designee shall upon its own action or upon written request of an authorized representative of the

Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract, or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime Contractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

**C. Health and Safety.** The provisions of this paragraph C are applicable only where the amount of the prime contract exceeds \$100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to this health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, 40 USC 3701 et. seq.

(3) The Contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

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AGREEMENT  
BETWEEN OWNER AND CONTRACTOR  
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between \_\_\_\_\_ City of Seneca \_\_\_\_\_ ("Owner")  
and \_\_\_\_\_ ("Contractor").

Owner and Contractor hereby agree as follows:

**ARTICLE 1 – WORK**

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

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**ARTICLE 2 - THE PROJECT**

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as the \_\_\_\_\_.

**ARTICLE 3 - CONTRACT TIMES**

3.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

3.02 Contract Times: Days

A. The Work will be substantially completed within \_\_\_\_days after the date of Contract execution. Final completion of work is within \_\_\_\_days after the date of the Contract execution.

3.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence as stated above and the Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 3.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner **\$500** for each day that expires after the time

(as duly adjusted pursuant to the Contract) specified for Substantial Completion until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner **\$500** for each day that expires after such time until the Work is completed and ready for final payment.
3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

#### **ARTICLE 4 - CONTRACT PRICE**

4.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

- A. Total of Lump Sum Amount and Unit Price Work \$ \_\_\_\_\_
- B. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

#### **ARTICLE 5 - PAYMENT PROCEDURES**

5.01 Submittal and Processing of Payments

- A. Contractor shall submit Applications for Payment in accordance with the Other Terms and Considerations. Applications for Payment will be processed by \_\_\_\_\_.

5.02 Progress and Final Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 25th day of each month during performance of the Work as provided in Paragraphs 5.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the schedule of values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided elsewhere in the contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

- a. **90 %** Percent of Work completed (with the balance being Retainage);
- b. **90%** Percent of cost of materials and equipment not incorporated in the Work (with the balance being Retainage).

B. Upon Substantial Completion of the entire construction to be provided under the Contract Documents, Owner shall pay an amount sufficient to increase total payments to Contractor to 100% of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions,

and less 100% of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

#### 5.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

### **ARTICLE 6 -CONTRACTOR'S REPRESENTATIONS**

6.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given ACOG written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by ACOG is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

## **ARTICLE 7 - CONTRACT DOCUMENTS**

### 7.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement.
2. Performance bond.
3. Payment bond.
4. Bid bond.
5. General Conditions.
6. Supplementary Conditions.
7. Specifications as listed in the table of contents of the Project Manual.
8. Drawings (not attached but incorporated by reference) consisting of the Drawings listed on the attached sheet index.
9. Addenda (numbers, \_\_\_\_\_ inclusive).
10. Exhibits to this Agreement (enumerated as follows):
  - Contractor's Bid.
11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
  - a. Notice to Proceed.
  - b. Change Orders.
  - c. Certificate of Substantial Completion.
  - d. Mitigation Measures and Conditions.



- B. The documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

## **ARTICLE 8 - MISCELLANEOUS**

### **8.01 Terms**

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

### **8.02 Assignment of Contract**

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

### **8.03 Successors and Assigns**

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

### **8.04 Severability**

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

### **8.05 Contractor's Certifications**

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph:
  1. "Corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "Fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. "Collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. "Coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

Other Provisions

Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on \_\_\_\_\_ (which is the Effective Date of the Contract).

OWNER:

CONTRACTOR:

\_\_\_\_\_

By: \_\_\_\_\_ By: \_\_\_\_\_

Title: \_\_\_\_\_ Title: \_\_\_\_\_

Attest: \_\_\_\_\_ Attest: \_\_\_\_\_

Title: \_\_\_\_\_ Title: \_\_\_\_\_

Address for giving notices:

Address for giving notices:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

"General Decision Number: SC20250039 01/03/2025

Superseded General Decision Number: SC20240039

State: South Carolina

Construction Type: Highway

Counties: Abbeville, Cherokee, Chester, Chesterfield, Clarendon, Dillon, Greenwood, Lancaster, Lee, Marion, Marlboro, McCormick, Oconee and Union Counties in South Carolina.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 14026 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.</li> </ul>
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 13658 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.</li> </ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at

http://www.dol.gov/whd/govcontracts.

Modification Number      Publication Date  
 0                              01/03/2025

SUSC2011-037 09/15/2011

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 14.00	**
CEMENT MASON/CONCRETE FINISHER		
Abbeville, Cherokee,		
Chester, Greenwood,		
Lancaster, McCormick,		
Oconee, Union.....	\$ 11.63	**
Chesterfield, Clarendon,		
Dillon, Lee, Marion,		
Marlboro.....	\$ 13.02	**
GUARDRAIL INSTALLER (Includes		
Guardrail/Post Driver Work)		
Abbeville, Cherokee,		
Chester, Chesterfield,		
Clarendon, Dillon,		
Greenwood, Lancaster, Lee,		
Marion, Marlboro,		
McCormick, Union.....	\$ 12.52	**
Oconee.....	\$ 12.65	**
IRONWORKER, REINFORCING.....	\$ 15.64	**
LABORER		
Asphalt, Includes Asphalt		
Distributor, Raker,		
Shoverler, and Spreader.....	\$ 10.96	**
Common or General		
Abbeville, Greenwood.....	\$ 8.85	**
Cherokee.....	\$ 9.40	**
Chester.....	\$ 9.55	**
Chesterfield.....	\$ 9.93	**
Clarendon, Dillon, Lee,		
Marion, Marlboro.....	\$ 10.00	**
Lancaster.....	\$ 9.67	**
McCormick, Union.....	\$ 9.39	**
Oconee.....	\$ 9.47	**
Luteman.....	\$ 10.93	**
Pipelayer.....	\$ 13.87	**
Traffic Control- Cone		
Setter.....	\$ 12.47	**
Traffic Control-Flagger		
Abbeville, Cherokee,		
Chester, Chesterfield,		
Clarendon, Dillon,		
Greenwood, Lee, Marion,		
Marlboro, McCormick,		
Oconee, Union.....	\$ 10.15	**
Lancaster.....	\$ 10.83	**
POWER EQUIPMENT OPERATOR:		
Backhoe/Excavator/Trackhoe		
Abbeville, Cherokee,		
Chester, Greenwood,		
Lancaster, McCormick,		

Oconee, Union.....\$ 16.25 \*\*  
 Chesterfield, Clarendon,  
 Dillon, Lee, marion,  
 Marlboro.....\$ 15.08 \*\*  
 Bulldozer.....\$ 13.66 \*\*           3.40  
 Crane.....\$ 20.12  
 Grader/Blade  
 Abbeville, Cherokee,  
 Chester, Greenwood,  
 Lancaster, McCormick,  
 Oconee, Union.....\$ 16.20 \*\*  
 Chesterfield, Clarendon,  
 Dillon, Lee, Marion,  
 Marlboro.....\$ 15.85 \*\*  
 Loader (Front End).....\$ 15.51 \*\*  
 Mechanic.....\$ 18.22  
 Milling Machine.....\$ 15.51 \*\*  
 Paver  
 Abbeville, Cherokee,  
 Chester, Greenwood,  
 Lancaster, McCormick,  
 Oconee, Union.....\$ 14.58 \*\*  
 Chesterfield, Clarendon,  
 Dillon, Lee, Marion,  
 Marlboro.....\$ 13.39 \*\*  
 Roller  
 Abbeville, Cherokee,  
 Chester, Greenwood,  
 Lancaster, McCormick,  
 Oconee, Union.....\$ 11.22 \*\*  
 Chesterfield, Clarendon,  
 Dillon, Lee, Marion,  
 Marlboro.....\$ 11.95 \*\*  
 Screed.....\$ 12.45 \*\*  
 Tractor.....\$ 13.26 \*\*

TRUCK DRIVER

Dump Truck  
 Abbeville, Cherokee,  
 Chester, Greenwood,  
 Lancaster, McCormick,  
 Oconee, Union.....\$ 12.83 \*\*  
 Clarendon, Dillon, Lee,  
 Marion, Marlboro.....\$ 11.69 \*\*  
 Lowboy Truck  
 Abbeville, Cherokee,  
 Chester, Greenwood,  
 Lancaster, McCormick,  
 Oconee Union.....\$ 14.19 \*\*  
 Chesterfield, Clarendon,  
 Dillon, Lee, Marion,  
 Marlboro.....\$ 14.16 \*\*  
 Single Axle, Includes  
 Pilot Car  
 Abbeville, Cherokee,  
 Greenwood, Lancaster,  
 McCormick, Oconee, Union...\$ 10.83 \*\*  
 Tractor Haul truck.....\$ 16.25 \*\*

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 WELDERS - Receive rate prescribed for craft performing  
 operation to which welding is incidental.

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

#### Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

## Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE:

UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

## Survey Rate Identifiers

The "SU" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

## State Adopted Rate Identifiers

The "SA" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

## ----- WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification

and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to [davisbaconinfo@dol.gov](mailto:davisbaconinfo@dol.gov) or by mail to:

Branch of Wage Surveys  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to [BCWD-Office@dol.gov](mailto:BCWD-Office@dol.gov) or by mail to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to [dba.reconsideration@dol.gov](mailto:dba.reconsideration@dol.gov) or by mail to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210.

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END OF GENERAL DECISION"



"General Decision Number: SC20250017 01/03/2025

Superseded General Decision Number: SC20240017

State: South Carolina

Construction Type: Building

Counties: Abbeville, Cherokee, McCormick, Oconee and Union Counties in South Carolina.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 14026 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.</li> </ul>
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 13658 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.</li> </ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number      Publication Date

0

01/03/2025

ELEC0379-011 09/01/2024

ABBEVILLE, CHEROKEE, OCONEE, & UNION

	Rates	Fringes
ELECTRICIAN.....	\$ 32.31	15.5%+8.65

Work from swinging scaffolds, boson chairs, or raw structural steel: \$1.00 per hour additional.

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ELEC1579-012 10/01/2024

MCCORMICK

	Rates	Fringes
ELECTRICIAN.....	\$ 30.75	16.64

Work from swinging boson chairs, spiders, and/or similar devices: 20% per hour additional.

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SUSC2011-013 08/31/2011

	Rates	Fringes
CARPENTER, Excludes Form Work....	\$ 14.46 **	0.78
FORM WORKER.....	\$ 14.23 **	0.00
LABORER: Common or General.....	\$ 9.76 **	0.76
LABORER: Pipelayer.....	\$ 12.62 **	1.46
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 16.17 **	1.76
PAINTER: Brush, Roller and Spray.....	\$ 13.55 **	1.20
PIPEFITTER.....	\$ 19.58	4.94
PLUMBER.....	\$ 16.99 **	2.17
SHEET METAL WORKER (HVAC Duct Installation Only).....	\$ 16.00 **	0.00
TRUCK DRIVER.....	\$ 12.76 **	2.04

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to

which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

#### Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

#### Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a

weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

#### Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

#### State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

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#### WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to [davisbaconinfo@dol.gov](mailto:davisbaconinfo@dol.gov) or by mail to:

Branch of Wage Surveys  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210.

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END OF GENERAL DECISION"

10/16

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION,  
INELIGIBILITY AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS**

This certification is required by the regulations implementing Executive Orders 12549 and 12689, Debarment and Suspension, and 2 CFR Part 200, Participants' responsibilities. )

*(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS BELOW)*

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principles are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

**Grant Number:** 4-G-22-20746

**Name of Participant:** \_\_\_\_\_

**Address of Participant:** \_\_\_\_\_

Name and Title of Authorized Representative	Signature	Date
<p>1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.</p> <p>2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.</p> <p>3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.</p> <p>4. The terms "covered transaction", "debarred", "suspended", "ineligible", "lower tier covered transaction", "participant", "person", "primary covered transaction", "principal", "proposal", and "voluntarily excluded", as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Orders 12549 and 12689.</p> <p>5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.</p> <p>6. The prospective lower tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion -- Lower Tier Covered Transactions", without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.</p> <p>7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may check the System for Award Management (SAM).</p> <p>8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.</p> <p>9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.</p>		

## Engineer/Architect's Build America, Buy America Act ( BABAA) Certification

Grantee name: City of Seneca

Grant Number: 4-G-22-20746

Project Name: Seneca Amphitheater

Federal Funding Agency: Appalachian Regional Commission

This “*Optional Buy America Preference Certification*” is used to certify that, as required by the Build America, Buy America (BABA) Act, all of the iron, steel, manufactured products, and construction materials incorporated into an infrastructure project are produced in the United States, unless exempted by a HUD general waiver or a project-/ product-specific waiver approved by the Made in America Office (MIAO) at the Office of Management and Budget OMB).

**For covered materials not otherwise exempted from the Buy America Preference (BAP), the undersigned certifies the following:**

- All iron and steel used in the project are produced in the United States. This means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;
- All manufactured products used in the project are produced in the United States. This means the manufactured product was manufactured in the United States, and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product;
- All construction materials used in the project are manufactured in the United States. This means that all manufacturing processes for the construction material occurred in the United States.

***Attach a list of all covered materials procured and used in the project.***

I hereby certify this information is complete and accurate and agree to provide documentation collected on the country of origin for all covered materials I caused to be incorporated into or affixed to an infrastructure project. I understand and agree that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

Signature	Title/Organization	Date





# Bidder's Build America, Buy America Act (BABAA) Certification

Grant Number \_\_\_\_\_

Project Name \_\_\_\_\_

Federal Funding Agency \_\_\_\_\_

This project is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, 95% of all iron and steel, manufactured products, and construction materials used in this project must be produced in the United States- this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States. Any request for substitute or "or equal" shall include the Manufacturer's Certification of compliance with the BABAA requirements

Documentation of BABAA compliance must be provided by the contractor for a minimum of 95% of all iron and steel, manufactured products, and construction materials used in the project. Written evidence from the manufacturer or supplier will be required that identifies the item purchased; affirms the location of manufacture as within the United States; and is signed by an authorized company representative.

BABAA compliance is further outlined by the Office of Management and Budget's Memorandum M-22-11, "Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.", October 25, 2023.

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Signature of Bidder \_\_\_\_\_ Date \_\_\_\_\_

Printed Name and Title of Bidder \_\_\_\_\_

Name of Bidder's Company \_\_\_\_\_

Bidder's Company Address \_\_\_\_\_

Bidder's Telephone Number \_\_\_\_\_

# Grantee Build America, Buy America Act (BABAA) Certification

Grant Number \_\_\_\_\_

Project Name \_\_\_\_\_

Grantee Name \_\_\_\_\_

Federal Funding Agency Appalachian Regional Commission

Grant Period: From 08/01/2022 To 07/31/2026

This project is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States (U.S.), as further outlined by the Office of Management and Budget's Memorandum M-24-02, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, October 25, 2023.

The Grantee Certification is to be submitted throughout the duration of the project and covers materials purchased by a contractor or by the Grantee. A Grantee representative must sign and submit this form with each draw request to certify the identified project is in compliance with BABAA requirements.

I certify, to the best of my knowledge and belief, that the above referenced project complies with Build America, Buy America Act (BABAA) as required by federal law, and that a minimum of 95% of the iron and steel, manufactured products and construction materials permanently placed and/or stored during the above referenced period were produced in the United States, unless a waiver was granted by the the Federal Funding Agency.

I understand that a false statement on this certification may be grounds for termination of the grant agreement.

\_\_\_\_\_  
Signature of Project Grantee Representative

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\_\_\_\_\_  
Printed Name and Title of Project Grantee Representative

**SOUTH CAROLINA ILLEGAL IMMIGRATION REFORM ACT**  
**CONTRACTOR CERTIFICATION**

In accordance with the requirements of the South Carolina Illegal Immigration Reform Act, Contractor Name (“Contractor”) hereby certifies that it is currently in compliance with the requirements of Title 8, Chapter 14 of the S.C. Code Annotated and will remain in compliance with such requirements throughout the term of its contract with City of Seneca (“Owner”).

Contractor hereby acknowledges that in order to comply with requirements of S.C. Code Annotated Section 8-14-20(B), it will:

1. Register and participate in the federal work authorization program (E-Verify) to verify the employment authorization of all new employees; and require agreement from its subcontractors, and through the subcontractors, the sub-subcontractors, to register and participate in the federal verification the employment authorization of all new employees.

Contractor agrees to provide to Owner any documentation required to establish the applicability of the South Carolina Illegal Immigration Reform Act to the Contractor, subcontractor, or sub-subcontractor. Contractor further agrees that it will provide Owner with any documentation required to establish that the Contractor and any subcontractors or sub-subcontractors are in compliance with the requirements of Title 8, Chapter 14 of the S.C. Code Annotated.

Date: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

### **Mitigation Measures and Conditions [40 CFR 1505.2(c)]**

Summarize below all mitigation measures adopted by the Responsible Entity to reduce, avoid, or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with the above-listed authorities and factors. These measures/conditions must be incorporated into project contracts, development agreements, and other relevant documents. The staff responsible for implementing and monitoring mitigation measures should be clearly identified in the mitigation plan.

Law, Authority, or Factor	Mitigation Measure
<p><b>Historic Preservation</b> National Historic Preservation Act of 1966, particularly sections 106 and 110; 36 CFR Part 800</p>	<ul style="list-style-type: none"><li>• <b>SHPO</b> (letter 10.25.22) Notify if archaeological materials are encountered. Contact: John Sylvest / <a href="mailto:sylvest@scdah.state.sc.us">sylvest@scdah.state.sc.us</a> / 803-896-6129</li><li>• <b>Catawba Indian Nation</b> (letter 11.2.23) If cultural resources or human remains are encountered, stop project and notify Contact: Caitlin Rogers/ <a href="mailto:caitlinh@ccppcrafts.com">caitlinh@ccppcrafts.com</a> / 803-328-2427 ext. 226</li><li>• <b>Cherokee Nation</b> (letter 10.24.2023) Halt all project activities immediately and re-contact our office for further consultation if items of cultural significance are discovered during the course of the project. Elizabeth Toombs, THPO, <a href="mailto:elizabeth-toombs@cherokee.org">elizabeth-toombs@cherokee.org</a>, 918-453-5389</li></ul>