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PROJECT NAME: SLED Entrance Road and Water Line Extension

PROJECT NUMBER: H18-9592-PD-A

TECHNICAL SPECIFICATIONS

SE-310
INVITATION FOR DESIGN-BID-BUILD CONSTRUCTION SERVICES

AGENCY/OWNER: Francis Marion University

PROJECT NAME: SLED Entrance Road and Water Line Extension

PROJECT NUMBER: H18-9592-PD-A **CONSTRUCTION COST RANGE:** $ 300,000 to $ 400,000

PROJECT LOCATION: Francis Marion Road, Florence, SC

DESCRIPTION OF PROJECT/SERVICES: Site Grading and storm drainage work associated with the SLED Building Entrance work and Water Line Extension

BID/SUBMITTAL DUE DATE: 6/13/24 **TIME:** 9:00 am **NUMBER OF COPIES:** 1

PROJECT DELIVERY METHOD: Design-Bid-Build

AGENCY PROJECT COORDINATOR: Lee Capotosti

EMAIL: lee.capotosti@rmarion.edu **TELEPHONE:** (843) 661-1309

DOCUMENTS MAY BE OBTAINED FROM: Posted to Francis Marion University site fmarion.edu/facilities management

BID SECURITY IS REQUIRED IN AN AMOUNT NOT LESS THAN 5% OF THE BASE BID.

PERFORMANCE AND LABOR & MATERIAL PAYMENT BONDS: The successful Contactor will be required to provide Performance and Labor and Material Payment Bonds, each in the amount of 100% of the Contract Price.

DOCUMENT DEPOSIT AMOUNT: $ 0.00 **IS DEPOSIT REFUNDABLE** **Yes** ☐ **No** ☐ **N/A** ☒

Bidders must obtain Bidding Documents/Plans from the above listed source(s) to be listed as an official plan holder. Bidders that rely on copies obtained from any other source do so at their own risk. All written communications with official plan holders & bidders will be via email or website posting.

Agency **WILL NOT** accept Bids sent via email.

All questions & correspondence concerning this Invitation shall be addressed to the A/E.

A/E NAME: Bill Ervin **A/E CONTACT:** P.O. Box 3 Florence SC 29503

EMAIL: Bill@ervinengineering.com **TELEPHONE:** (843) 662-4941

PRE-BID CONFERENCE: **Yes** ☒ **No** ☐ **MANDATORY ATTENDANCE:** **Yes** ☐ **No** ☒

PRE-BID DATE: **May 30, 2024** **TIME:** **9:00 am**

PRE-BID PLACE: **FMU Facilities Management Building 4822 E. Palmetto Street Florence, SC 29502**

BID OPENING PLACE: Francis Marion Facilities Management Building - 4822 E. Palmetto Street, Florence, SC 29502

BID DELIVERY ADDRESSES:

HAND-DELIVERY:
Attn: Lee Capotosti
4822 E.Palmetto Street
Florence, SC 29502

MAIL SERVICE:
Attn: Lee Capotosti
4822 E. Plametto Street
Florence, SC 29502

IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? ***(Agency MUST check one)*** **Yes** ☐ **No** ☒

APPROVED BY: _____ **DATE:** _____
(OSE Project Manager)

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A701™ – 2018

Instructions to Bidders

This version of AIA Document A701™–2018 is modified by the South Carolina Division of Procurement Services, Office of State Engineer ("SCOSE"). Publication of this version of AIA Document A701–2018 does not imply the American Institute of Architects' endorsement of any modification by SCOSE. A comparative version of AIA Document A701–2018 showing additions and deletions by SCOSE is available for review on the SCOSE Web site.

Cite this document as "AIA Document A701™– 2018, Instructions to Bidders — SCOSE Version," or "AIA Document A701™–2018 — SCOSE Version."

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A701™ – 2018

Instructions to Bidders

for the following Project:
(Name, State Project Number, location, and detailed description)
SLED Entrance Road and Water Line Extension
H18-9592-PD-A
Francis Marion Road

THE OWNER:
(Name, legal status, address, and other information)
Francis Marion University
4822 E. Palmetto St.
Florence, SC 29502

The Owner is a Governmental Body of the State of South Carolina as defined by S.C. Code Ann. § 11-35-310.

THE ARCHITECT:
(Name, legal status, address, and other information)
William C. Ervin, Jr., P.E.
341 w evans st
Florence, SC 29501

This version of AIA Document A701-2018 is modified by the South Carolina Division of Procurement Services, Office of State Engineer. Publication of this version of AIA Document A701 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement Services, Office of State Engineer. A comparative version of AIA Document A701–2018 showing additions and deletions by the South Carolina Division of Procurement Services, Office of State Engineer is available for review on South Carolina state Web site.

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

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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.

§ 1.1.1 Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA Document A101-2017 Standard Form of Agreement Between Owner and Contractor, SCOSE Version. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA Document A201-2017 General Conditions of the Contract for Construction, SCOSE Version.

§ 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.

§ 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, has correlated the Bidder's observations with the requirements of the Proposed Contract Documents, and accepts full responsibility for any pre-bid existing conditions that would affect the Bid that could have been ascertained by a site visit. As provided in S.C. Code Ann. Reg. 19-445.2042(B), a bidder's failure to attend an advertised pre-bid conference will not excuse its responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the State;

.5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception;

.6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor; and

.7 the Bidder understands that it may be required to accept payment by electronic funds transfer (EFT).

§ 2.2 Certification of Independent Price Determination

§ 2.2.1 GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SC CODE OF LAWS §16-9-10 AND OTHER APPLICABLE LAWS.

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§ 2.2.2 By submitting a Bid, the Bidder certifies that:

.1 The prices in this Bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to:

.1 those prices;
.2 the intention to submit a Bid; or
.3 the methods or factors used to calculate the prices offered.

.2 The prices in this Bid have not been and will not be knowingly disclosed by the Bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

.3 No attempt has been made or will be made by the Bidder to induce any other concern to submit or not to submit a Bid for the purpose of restricting competition.

§ 2.2.3 Each signature on the Bid is considered to be a certification by the signatory that the signatory:

.1 Is the person in the Bidder's organization responsible for determining the prices being offered in this Bid, and that the signatory has not participated and will not participate in any action contrary to Section 2.2.2 of this certification; or

.2 Has been authorized, in writing, to act as agent for the Bidder's principals in certifying that those principals have not participated, and will not participate in any action contrary to Section 2.2.2 of this certification [As used in this subdivision, the term "principals" means the person(s) in the Bidder's organization responsible for determining the prices offered in this Bid];

.3 As an authorized agent, does certify that the principals referenced in Section 2.2.3.2 of this certification have not participated, and will not participate, in any action contrary to Section 2.2.2 of this certification; and

.4 As an agent, has not personally participated, and will not participate, in any action contrary to Section 2.2.2 of this certification.

§ 2.2.4 If the Bidder deletes or modifies Section 2.2.2.2 of this certification, the Bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

§ 2.2.5 Drug Free Workplace Certification

By submitting a Bid, the Bidder certifies that, if awarded a contract, Bidder will comply with all applicable provisions of The Drug-free Workplace Act, S.C. Code Ann. 44-107-10, et seq.

§ 2.2.6 Certification Regarding Debarment and Other Responsibility Matters

§ 2.2.6.1 By submitting a Bid, Bidder certifies, to the best of its knowledge and belief, that:

.1 Bidder and/or any of its Principals-

.1 Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;

.2 Have not, within a three-year period preceding this Bid, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and

.3 Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in Section 2.2.6.1.1.2 of this provision.

.2 Bidder has not, within a three-year period preceding this Bid, had one or more contracts terminated for default by any public (Federal, state, or local) entity.

.3 "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

§ 2.2.6.2 Bidder shall provide immediate written notice to the Procurement Officer if, at any time prior to contract award, Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

§ 2.2.6.3 If Bidder is unable to certify the representations stated in Section 2.2.6.1, Bidder must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Bidder's responsibility. Failure of the Bidder to furnish additional information as requested by the Procurement Officer may render the Bidder non-responsible.

§ 2.2.6.4 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 Section 2.2.6.1 of this provision. The knowledge and information of a Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

§ 2.2.6.5 The certification in Section 2.2.6.1 of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Bidder knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the State, the Procurement Officer may terminate the contract resulting from this solicitation for default.

§ 2.2.7 Ethics Certificate

By submitting a Bid, the Bidder certifies that the Bidder has and will comply with, and has not, and will not, induce a person to violate Title 8, Chapter 13 of the SC Code of Laws, as amended (Ethics Act). The following statutes require special attention: S.C. Code Ann. §8-13-700, regarding use of official position for financial gain; S.C. Code Ann. §8-13-705, regarding gifts to influence action of public official; S.C. Code Ann. §8-13-720, regarding offering money for advice or assistance of public official; S.C. Code Ann. §8-13-755 and §8-13-760, regarding restrictions on employment by former public official; S.C. Code Ann. §8-13-775, prohibiting public official with economic interests from acting on contracts; S.C. Code Ann. §8-13-790, regarding recovery of kickbacks; S.C. Code Ann. §8-13-1150, regarding statements to be filed by consultants; and S.C. Code Ann. §8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The State may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If the contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, the contractor shall, if required by law to file such a statement, provide the statement required by S.C. Code Ann. §8-13-1150 to the Procurement Officer at the same time the law requires the statement to be filed.

§ 2.2.8 Restrictions Applicable To Bidders & Gifts

Violation of these restrictions may result in disqualification of your Bid, suspension or debarment, and may constitute a violation of the state Ethics Act.

§ 2.2.8.1 After issuance of the solicitation, Bidder agrees not to discuss this procurement activity in any way with the Owner or its employees, agents or officials. All communications must be solely with the Procurement Officer. This restriction may be lifted by express written permission from the Procurement Officer. This restriction expires once a contract has been formed.

§ 2.2.8.2 Unless otherwise approved in writing by the Procurement Officer, Bidder agrees not to give anything to the Owner, any affiliated organizations, or the employees, agents or officials of either, prior to award.

§ 2.2.8.3 Bidder acknowledges that the policy of the State is that a governmental body should not accept or solicit a gift, directly or indirectly, from a donor if the governmental body has reason to believe the donor has or is seeking to obtain contractual or other business or financial relationships with the governmental body. SC Regulation 19-445.2165(C) broadly defines the term donor.

§ 2.2.9 Open Trade Representation

By submitting a Bid, the Bidder represents that Bidder is not currently engaged in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in S.C. Code Ann. §11-35-5300.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

§ 3.1.2 Any required deposit shall be refunded to all plan holders who return the paper Bidding Documents in good condition within ten (10) 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 Reserved

§ 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.

§ 3.1.6 All persons obtaining Bidding Documents from the issuing office designated in the advertisement shall provide that office with Bidder's contact information to include the Bidder's name, telephone number, mailing address, and email address.

§ 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. Failure to do so will be at the Bidder's risk. Bidder assumes responsibility for any patent ambiguity that Bidder does not bring to the Architect's attention prior to Bid Opening.

§ 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 ten (10) days prior to the date for receipt of Bids.

§ 3.2.3 Modifications, corrections, changes, and interpretations of the Bidding Documents shall be made by Addendum. Modifications, corrections, changes, and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.2.4 As provided in S.C. Code Ann. Reg. 19-445.2042(B), nothing stated at the Pre-bid conference shall change the Bidding Documents unless a change is made by Addendum.

§ 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. Where "brand name or equal" is used in the Bidding Documents, the listing description is not intended to limit or restrict competition.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten (10) 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.

§ 3.3.2.4 No request to substitute materials, products, or equipment for materials, products, or equipment described in the Bidding Documents and no request for addition of a manufacturer or supplier to a list of approved manufacturers or suppliers in the Bidding Documents will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten (10) days prior to the date for receipt of Bids established in the invitation to bid.

Any subsequent extension of the date for receipt of Bids by addendum shall not extend the date for receipt of such requests unless the addendum so specifies. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the Work of other contracts that incorporation of the proposed substitution would require, shall be included.

§ 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.

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued at least five (5) business days before the day of the Bid Opening, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids. A business day runs from midnight to midnight and excludes weekends and state and federal holidays.

§ 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.

§ 3.4.5 When the date for receipt of Bids is to be postponed and there is insufficient time to issue an Addendum prior to the original Bid Date, the Owner will notify prospective Bidders by telephone or other appropriate means with immediate follow up with an Addendum. This Addendum will verify the postponement of the original Bid Date and establish a new Bid Date. The new Bid Date will be no earlier than the fifth (5th) business day after the date of issuance of the Addendum postponing the original Bid Date.

§ 3.4.6 If an emergency or unanticipated event interrupts normal government processes so that Bids cannot be received at the government office designated for receipt of Bids by the exact time specified in the solicitation, the time specified for receipt of Bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal government processes resume. In lieu of an automatic extension, an Addendum may be issued to reschedule Bid Opening. If state offices are closed in the county in which Bids are to be received at the time a pre-bid or pre-proposal conference is scheduled, an Addendum will be issued to reschedule the conference. Bidders shall visit https://www.scemd.org/closings/ for information concerning closings.

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 numbers.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid. Bidder shall not make stipulations or qualify his Bid in any manner not permitted on the Bid Form. An incomplete Bid or information not requested that is written on or attached to the Bid Form that could be considered a qualification of the Bid, may be cause for rejection of the Bid.

§ 4.1.5 All requested Alternates shall be bid. The failure of the Bidder to indicate a price for an Alternate shall render the Bid non-responsive. Indicate the change to the Base Bid by entering the dollar amount and marking, as appropriate, the box for "ADD TO" or "DEDUCT FROM". If no change in the Base Bid is required, enter "ZERO" or "No Change".

§ 4.1.6 Pursuant to S.C. Code Ann. § 11-35-3020(b)(i), as amended, Section 7 of the Bid Form sets forth a list of proposed subcontractors for which the Bidder is required to identify those subcontractors the Bidder will use to perform the work listed. Bidder must follow the instructions in the Bid Form for filling out this section of the Bid Form. Failure to properly fill out Section 7 may result in rejection of Bidder's bid as non-responsive.

§ 4.1.7 Contractors and subcontractors listed in Section 7 of the Bid Form who are required by the South Carolina Code of Laws to be licensed, must be licensed as required by law at the time of bidding.

§ 4.1.8 Each copy of the Bid shall state the legal name and legal status of the Bidder. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract.

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

§ 4.2 Bid Security

§ 4.2.1 If required by the invitation to bid, each Bid shall be accompanied by a bid security in an amount of not less than five percent of the Base Bid. The bid security shall be a bid bond or a certified cashier's check.

§ 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.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond and 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 Bid Bond shall:

.1 be issued by a surety company licensed to do business in South Carolina;

.2 be issued by a surety company having, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty", which company shows a financial strength rating of at least five (5) times the contract price.

.3 be enclosed in the bid envelope at the time of Bid Opening, either in paper copy or as an electronic bid bond authorization number provided on the Bid Form and issued by a firm or organization authorized by the surety to receive, authenticate and issue binding electronic bid bonds on behalf the surety.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and performance and payment 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.

§ 4.2.5 By submitting a Bid Bond via an electronic bid bond authorization number on the Bid Form and signing the Bid Form, the Bidder certifies that an electronic bid bond has been executed by a Surety meeting the standards required by the Bidding Documents and the Bidder and Surety are firmly bound unto the State of South Carolina under the conditions provided in this Section 4.2.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:

§ 4.3.2 All 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, unless hand delivered by the Bidder, be addressed to the Owner's designated purchasing office as shown in the invitation to bid. The envelope 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, or special delivery service (UPS, Federal Express, etc.), the sealed envelope shall be labelled "SEALED BID ENCLOSED" on the face thereof. Bidders hand delivering their Bids shall deliver Bids to the place of the Bid Opening as shown in the invitation for bids. Whether or not Bidders attend the Bid Opening, they shall give their Bids to the Owner's Procurement Officer or his/her designee as shown in the invitation to bid prior to the time of the Bid Opening.

§ 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. Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.3.6 The official time for receipt of Bids will be determined by reference to the clock designated by the Owner's Procurement Officer or his/her designee. The Procurement Officer conducting the Bid Opening will determine and announce that the deadline has arrived and no further Bids or bid modifications will be accepted. All Bids and bid modifications in the possession of the Procurement Officer at the time the announcement is completed will be timely, whether or not the bid envelope has been date/time stamped or otherwise marked by the Procurement Officer.

§ 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.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

Bids received on time will be publicly opened and read aloud. The Owner will not read aloud Bids that the Owner determines, at the time of opening, to be non-responsive.

§ 5.1.1 At Bid Opening, the Owner will announce the date and location of the posting of the Notice of Intend to Award. If the Owner determines to award the Project, the Owner will, after posting a Notice of Intend to Award, send a copy of the Notice to all Bidders.

§ 5.1.2 The Owner will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the Bid Opening.

§ 5.1.3 If only one Bid is received, the Owner will open and consider the Bid.

§ 5.2 Rejection of Bids

§ 5.2.1 The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.2.2 The reasons for which the Owner will reject Bids include, but are not limited to:

.1 Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
.2 Failure to deliver the Bid on time;
.3 Failure to comply with Bid Security requirements, except as expressly allowed by law;
.4 Listing an invalid electronic Bid Bond authorization number on the Bid Form;
.5 Failure to Bid an Alternate, except as expressly allowed by law;
.6 Failure to list qualified subcontractors as required by law;
.7 Showing any material modification(s) or exception(s) qualifying the Bid;
.8 Faxing a Bid directly to the Owner or Owner's representative; or
.9 Failure to include a properly executed Power-of-Attorney with the Bid Bond.

§ 5.2.3 The Owner may reject a Bid as nonresponsive if the prices bid are materially unbalanced between line items or sub-line items. A Bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the Bid

will result in the lowest overall cost to the Owner even though it may be the low evaluated Bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

§ 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 and does not exceed available funds. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the 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 Responsibility

Owner will make a determination of Bidder's responsibility before awarding a contract. Bidder shall provide all information and documentation requested by the Owner to support the Owner's evaluation of responsibility. Failure of Bidder to provide requested information is cause for the Owner, at its option, to determine the Bidder to be non-responsible.

§ 6.2 Reserved

§ 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.

§ 6.4 Posting of Intent To Award

The Notice of Intent to Award will be posted at the following location:

Room or Area of Posting: **Posted on physical plant bulletin board**
Building Where Posted: **Physical Plant**
Address of Building: **4822 E. Palmetto Street Florence, SC 29506**
WEB site address (if applicable): **https://www.fmarion.edu/facilitiesmanagement/**
Posting date will be announced at Bid Opening. In addition to posting the Notice, the Owner will promptly send all responsive Bidders a copy of the Notice of Intent to Award and the final bid tabulation

§ 6.5 Protest of Solicitation or Award

§ 6.5.1 If you are aggrieved in connection with the solicitation or award of a contract, you may be entitled to protest, but only as provided in S.C. Code Ann. § 11-35-4210. To protest a solicitation, you must submit a protest within fifteen (15) days of the date the applicable solicitation document is issued. To protest an award, you must (i) submit notice if your intent to protest within seven (7) business days of the date the award notice is posted, and (ii) submit your actual protest within fifteen (15) days of the date the award notice is posted. Days are calculated as provided in Section 11-35-310(13). Both protests and notices of intent to protest must be in writing and must be received by the State Engineer within the time provided. The grounds of the protest and the relief requested must be set forth with enough particularity to give notice of the issues to be decided.

§ 6.5.2 Any protest must be addressed to the CPO, Office of State Engineer, and submitted in writing:

.1 by email to protest-ose@mmo.sc.gov,

.2 by facsimile at 803-737-0639, or

.3 by post or delivery to 1201 Main Street, Suite 600, Columbia, SC 29201.

By submitting a protest to the foregoing email address, you (and any person acting on your behalf) consent to receive communications regarding your protest (and any related protests) at the e-mail address from which you sent your protest.

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.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the state of South Carolina.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of 100% of the Contract Sum.

§ 7.2 Time of Delivery of Contract, Certificates of Insurance, and Form of Bonds

§ 7.2.1 Following expiration of the protest period, the Owner will forward the Contract for Construction to the Bidder for signature. The Bidder shall return the fully executed Contract for Construction to the Owner within seven (7) days. The Bidder shall deliver the required bonds and certificate of insurance to the Owner not later than three (3) days following the date of execution of the Contract. Failure to deliver these documents as required shall entitle the Owner to consider the Bidder's failure as a refusal to enter into a contract in accordance with the terms and conditions of the Bidder's Bid and to make claim on the Bid Security for re-procurement cost.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on the Performance Bond and Payment Bond forms included in the Bid Documents.

§ 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, SCOSE Version.

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, SCOSE Version.

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction, SCOSE Version.

.4 Drawings

Number	Title	Date
Revision D	SLED Entrance Road & Water Line Ext. Francis Marion University OSE Project No. H18-9592-PD-A	4/29/2024

.5 Specifications

Section	Title	Date	Pages
Technical Specifications for Civil Site Work	**SLED Entrance Road & Water Line Ext. OSE Project #: H19-9592-PD-A**	**5/1/2024**	**125**

.6 Addenda:

Number	Date	Pages

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

☐ AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

☐ AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:

☐ The Sustainability Plan:

☐ Supplementary and other Conditions of the Contract:

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

ARTICLE 9 Miscellaneous

§ 9.1 Nonresident Taxpayer Registration Affidavit Income Tax Withholding Important Tax Notice - Nonresidents Only

§ 9.1.1 Withholding Requirements for Payments to Nonresidents: SC Code of Laws §12-8-550 requires persons hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within South Carolina to withhold 2% of each payment made to the nonresident. The withholding requirement does not apply to (1) payments on purchase orders for tangible personal property when the payments are not accompanied by services to be performed in South Carolina, (2) nonresidents who are not conducting business in South Carolina, (3) nonresidents for contracts that do not exceed $10,000 in a calendar year, or (4) payments to a nonresident who (a) registers with either the S.C. Department of Revenue or the S.C. Secretary of State and (b) submits a Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, Form I-312 to the person letting the contract.

§ 9.1.2 For information about other withholding requirements (e.g., employee withholding), contact the Withholding Section at the South Carolina Department of Revenue at 803-898-5383 or visit the Department's website at: www.sctax.org

§ 9.1.3 This notice is for informational purposes only. This Owner does not administer and has no authority over tax issues. All registration questions should be directed to the License and Registration Section at 803-898-5872 or to the South Carolina Department of Revenue, Registration Unit, Columbia, S.C. 29214-0140. All withholding questions should be directed to the Withholding Section at 803-898-5383.

PLEASE SEE THE "NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING" FORM (Available through SC Department of Revenue).

§ 9.2 Submitting Confidential Information

§ 9.2.1 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that the Bidder contends contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in Section 30-4-40(a)(1), or (b) privileged & confidential, as that phrase is used in SC Code of Laws §11-35-410.

§ 9.2.2 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that the Bidder contends contains a trade secret as that term is defined by SC Code of Laws §39-8-20.

§ 9.2.3 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that the Bidder contends is protected by SC Code of Laws §11-35-1810.

§ 9.2.4 All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire Bid as confidential, trade secret, or protected! If your Bid, or any part thereof, is improperly marked as confidential or trade secret or protected, the State may, in its sole discretion, determine it nonresponsive. If only portions of a page are subject to some protection, do not mark the entire page.

§ 9.2.5 By submitting a response to this solicitation, Bidder (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract (including, but not limited to, documents contained in a response, documents submitted to clarify a response, & documents submitted during negotiations), unless the page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or "PROTECTED", (2) agrees that any information not marked, as required by these bidding instructions, as a "Trade Secret" is not a trade secret as defined by the Trade Secrets Act, & (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure.

§ 9.2.6 In determining whether to release documents, the State will detrimentally rely on the Bidders' marking of documents, as required by these bidding instructions, as being either "Confidential" or "Trade Secret" or "PROTECTED".

§ 9.2.7 By submitting a response, the Bidder agrees to defend, indemnify & hold harmless the State of South Carolina, its officers & employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney's fees, arising out of or resulting from the State withholding information that Bidder marked as "confidential" or "trade secret" or "PROTECTED".

§ 9.3 Solicitation Information From Sources Other Than Official Source

South Carolina Business Opportunities (SCBO) is the official state government publication for State of South Carolina solicitations. Any information on State agency solicitations obtained from any other source is unofficial and any reliance placed on such information is at the Bidder's sole risk and is without recourse under the South Carolina Consolidated Procurement Code.

§ 9.4 Builder's Risk Insurance

Bidders are directed to Exhibit A of the AIA Document A101, 2017 SCOSE Version, which, unless provided otherwise in the Bid Documents, requires the contractor to provide builder's risk insurance on the project.

§ 9.5 Tax Credit For Subcontracting With Minority Firms

§ 9.5.1 Pursuant to S.C. Code Ann. §12-6-3350, taxpayers, who utilize certified minority subcontractors, may take a tax credit equal to 4% of the payments they make to said subcontractors. The payments claimed must be based on work performed directly for a South Carolina state contract. The credit is limited to a maximum of fifty thousand dollars annually. The taxpayer is eligible to claim the credit for 10 consecutive taxable years beginning with the taxable year in which the first payment is made to the subcontractor that qualifies for the credit. After the above ten consecutive taxable years, the taxpayer is no longer eligible for the credit. The credit may be claimed on Form TC-2, "Minority Business Credit." A copy of the subcontractor's certificate from the Governor's Office of Small and Minority Business (OSMBA) is to be attached to the contractor's income tax return.

§ 9.5.2 Taxpayers must maintain evidence of work performed for a State contract by the minority subcontractor. Questions regarding the tax credit and how to file are to be referred to: SC Department of Revenue, Research and Review, Phone: (803) 898-5786, Fax: (803) 898-5888.

§ 9.5.3 The subcontractor must be certified as to the criteria of a "Minority Firm" by the Governor's Office of Small and Minority Business Assistance (OSMBA). Certificates are issued to subcontractors upon successful completion of the certification process. Questions regarding subcontractor certification are to be referred to: Governor's Office of Small and Minority Business Assistance, Phone: (803) 734-0657, Fax: (803) 734-2498. Reference: S.C. Code Ann. §11-35-5010 – Definition for Minority Subcontractor & S.C. Code Ann. §11-35-5230 (B) – Regulations for Negotiating with State Minority Firms.

§ 9.6 Other Special Conditions Of The Work

AIA Document A310 – 2010 Will be inserted here.

SE-330
LUMP SUM BID FORM

Bidders shall submit bids on only Bid Form SE-330.

BID SUBMITTED BY: _____

(Bidder's Name)

BID SUBMITTED TO: Francis MarionUniversity

(Agency's Name)

FOR: PROJECT NAME: SLED Entrance Road and Water Line Extension

PROJECT NUMBER: H18-9592-PD-A

OFFER

§ 1. In response to the Invitation for Construction Services and in compliance with the Instructions to Bidders for the above-named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Agency on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

§ 2. Pursuant to SC Code § 11-35-3030(1), Bidder has submitted Bid Security in the amount and form required by the Bidding Documents.

§ 3. Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

(Bidder, check all that apply. Note, there may be more boxes than actual addenda. Do not check boxes that do not apply)

ADDENDA: ☐ **#1** ☐ **#2** ☐ **#3** ☐ **#4** ☐ **#5**

§ 4. Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid, including all Bid Alternates, if any, may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of **60** Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Agency.

§ 5. Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

§ 6.1 BASE BID WORK ***(as indicated in the Bidding Documents and generally described as follows)*****:** _____

$ _____, which sum is hereafter called the Base Bid.

(Bidder to insert Base Bid Amount on line above)

Site grading and storm drainage work associated with the SLED Building Entrance work and Water Line Extension

SE-330
LUMP SUM BID FORM

Bidders shall submit bids on only Bid Form SE-330.

§ 6.2 BID ALTERNATES as indicated in the Bidding Documents and generally described as follows:

ALTERNATE # 1 *(Brief Description)*: _____

☐ **ADD TO** or ☐ **DEDUCT FROM BASE BID: $** _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 2 *(Brief Description)*: _____

☐ **ADD TO** or ☐ **DEDUCT FROM BASE BID: $** _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 3 *(Brief Description)*: _____

☐ **ADD TO** or ☐ **DEDUCT FROM BASE BID: $** _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

§ 6.3 UNIT PRICES:

BIDDER offers for the Agency's consideration and use, the following UNIT PRICES. The UNIT PRICES offered by BIDDER indicate the amount to be added to or deducted from the CONTRACT SUM for each item-unit combination. UNIT PRICES include all costs to the Agency, including those for materials, labor, equipment, tools of trades and labor, fees, taxes, insurance, bonding, overhead, profit, etc. The Agency reserves the right to include or not to include any of the following UNIT PRICES in the Contract and to negotiate the UNIT PRICES with BIDDER prior to including in the Contract.

No.	ITEM	UNIT OF MEASURE	ADD	DEDUCT
1.	Removal of bad soils	Cubic Yard	$	$
2.	Replacement of Good Structural Fill	Cubic Yard	$	$
3.	3" C900 PVC Water Line and installation	Linear Feet	$	$
4.	8" Gabo Stone Base and install	Square Yd	$	$
5.	2" type C Asphalt	Square Yd	$	$
6.	15" RCP with Rip Rap HW	Linear Feet	$	$

SE-330
LUMP SUM BID FORM

§ 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED

(See Instructions on the following page BF-2A)

Bidder shall use the below-listed Subcontractors in the performance of the Subcontractor Classification work listed:

(A) SUBCONTRACTOR LICENSE CLASSIFICATION or SUBCLASSIFICATION NAME *(Completed by Agency)*	(B) LICENSE CLASSIFICATION or SUBCLASSIFICATION ABBREVIATION *(Completed by Agency)*	(C) SUBCONTRACTOR and/or PRIME CONTRACTOR *(Required - must be completed by Bidder)*	(D) SUBCONTRACTOR'S and/or PRIME CONTRACTOR'S SC LICENSE NUMBER *(Requested, but not Required)*
BASE BID			
Not Required			
ALTERNATE #1			
ALTERNATE #2			
ALTERNATE #3			

If a Bid Alternate is accepted, Subcontractors listed for the Bid Alternate shall be used for the work of both the Alternate and the Base Bid work.

SE-330
LUMP SUM BID FORM

INSTRUCTIONS FOR SUBCONTRACTOR LISTING

1. Section 7 of the Bid Form sets forth an Agency-developed list of subcontractor license classifications or subclassifications for which Bidder is required to identify the entity (subcontractor(s) and/or himself) Bidder will use to perform this work.
   a. **Columns A & B**: The Agency fills out these columns to identify the subcontractor license classification / subclassification and related license abbreviation for which the Bidder must list either a subcontractor or himself as the entity that will perform this work. In Column A, the subcontractor license classification/subclassification is identified by name and in Column B, the related contractor license abbreviation (per Title 40 of the SC Code of Laws) is listed. Abbreviations of licenses can be found at:

      https://llr.sc.gov/clb/PDFFiles/CLBClassificationAbbreviations.pdf. If the Agnecy has not identified a subcontractor license classification/subclassification, the Bidder does not list a subcontractor.

   b. **Columns C and D:** In these columns, the Bidder identifies the subcontractors it will use for the work of each license listed by the Agency in Columns A & B. Bidder must identify only the subcontractor(s) who will perform the work and no others. Bidders must make sure that their identification of each subcontractor is clear and unambiguous. A listing that could be any number of different entities may be cause for rejection of the bid as non-responsive. For example, a listing of M&M without additional information may be problematic if there are multiple different licensed contractors in South Carolina whose names start with M&M.
2. **Subcontractor Defined:** For purposes of subcontractor listing, a subcontractor is an entity who will perform work or render service to the prime contractor to or about the construction site pursuant to a contract with the prime contractor. Bidder should not identify sub-subcontractors in the spaces provided on the bid form but only those entities with which Bidder will contract directly. Likewise, do not identify material suppliers, manufacturers, and fabricators that will not perform physical work at the site of the project but will only supply materials or equipment to the Bidder or proposed subcontractor(s).
3. **Subcontractor Qualifications:** Bidder must only list subcontractors who possess a South Carolina contractor's license that includes the license classification and/or subclassification identified by the Agency in Columns A & B. The subcontractor license must also be within the appropriate license group for the work. If Bidder lists a subcontractor who is not qualified to perform the work, the Bidder will be rejected as non-responsible.
4. **Use of Own forces:** If, under the terms of the Bidding Documents and SC Contractor Licensing laws, Bidder is qualified to perform the work of a listed subcontractor classification or subclassification and Bidder does not intend to subcontract such work but to use Bidder's own employees to perform such work, the Bidder must insert itself in the space provided.
5. **Use of Multiple Subcontractors:**
   a. If Bidder intends to use multiple subcontractors to perform the work of a single license classification/subclassification, Bidder must insert the name of each subcontractor Bidder will use, preferably separating the name of each by the word **"and"**. If Bidder intends to use both his own employees to perform a part of the work of a single license classification/subclassification and to use one or more subcontractors to perform the remaining work, Bidder must insert itself and each subcontractor, preferably separating them with the word **"and"**. Bidder must use each entity listed for the work of a single license classification/subclassification in the performance of that work.
   b. **Optional Listing Prohibited:** Bidder may not list multiple subcontractors for a license classification/subclassification in a form that provides the Bidder the option, after bid opening or award, to choose one or more but not all the listed subcontractors to perform the work for which they are listed. A listing, which on its face requires subsequent explanation to determine whether it is an optional listing, is non-responsive. If Bidder intends to use multiple entities to perform the work for a single listing, Bidder must clearly set forth on the bid form such intent. Bidder may accomplish this by simply inserting the word "**and**" between the names of each entity listed. Agency will reject as non-responsive a listing that contains the names of multiple subcontractors separated by a blank space, the word "or", a virgule (that is a /), or any separator that the Agency may reasonably interpret as an optional listing.
6. If Bidder is awarded the contract, Bidder must, except with the approval of the Agency for good cause shown, use the listed entities to perform the work for which they are listed.
7. If Bidder is awarded the contract, Bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Section 7 of the Bid except for one or more of the reasons allowed by the SC Code of Laws.
8. Bidder's failure to identify an entity (subcontractor or himself) to perform the work of a subcontractor listed in Columns A & B will render the Bid non-responsive.

SE-330
LUMP SUM BID FORM

§ 8. LIST OF MANUFACTURERS, MATERIAL SUPPLIERS, AND SUBCONTRACTORS OTHER THAN SUBCONTRACTORS LISTED IN SECTION 7 ABOVE *(FOR INFORMATION ONLY):*

Pursuant to instructions in the Invitation for Construction Services, if any, Bidder will provide to Agency upon the Agency's request and within 24 hours of such request, a listing of manufacturers, material suppliers, and subcontractors, other than those listed in Section 7 above, that Bidder intends to use on the project. Bidder acknowledges and agrees that this list is provided for purposes of determining responsibility and not pursuant to the subcontractor listing requirements of SC Code § 11-35-3020(b)(i).

§ 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES

a) CONTRACT TIME

Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Agency. Bidder agrees to substantially complete the Work within **90** Calendar Days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b) LIQUIDATED DAMAGES

Bidder further agrees that from the compensation to be paid, the Agency shall retain as Liquidated Damages the amount of $**500.00** for each Calendar Day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

§ 10. AGREEMENTS

a) Bidder agrees that this bid is subject to the requirements of the laws of the State of South Carolina.

b) Bidder agrees that at any time prior to the issuance of the Notice to Proceed for this Project, this Project may be canceled for the convenience of, and without cost to, the State.

c) Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to the issuance of the Notice to Proceed.

§ 11. ELECTRONIC BID BOND

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, referenced in the Bidding Documents.

ELECTRONIC BID BOND NUMBER: _____

SIGNATURE AND TITLE: _____

SE-330
LUMP SUM BID FORM

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATION

SC Contractor's License Number(s): _____

Classification(s) & Limits: _____

Subclassification(s) & Limits: _____

By signing this Bid, the person signing reaffirms all representation and certification made by both the person signing and the Bidder, including without limitation, those appearing in Article 2 of the SCOSE Version of the AIA Document A701, Instructions to Bidders, is expressly incorporated by reference.

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

_____

TELEPHONE: _____

EMAIL: _____

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____

TITLE: _____

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A101® – 2017

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

This version of AIA Document A101®–2017 is modified by the South Carolina Division of Procurement Services, Office of State Engineer ("SCOSE"). Publication of this version of AIA Document A101–2017 does not imply the American Institute of Architects' endorsement of any modification by SCOSE. A comparative version of AIA Document A101–2017 showing additions and deletions by SCOSE is available for review on the SCOSE Web site.

Cite this document as "AIA Document A101®–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum — SCOSE Version," or "AIA Document A101®–2017 — SCOSE Version."

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A101®– 2017

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

AGREEMENT made as of the day of
in the year
(In words, indicate day, month and year.)

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

Francis Marion University
4822 E. Palmetto St
Florence, SC 29502

The Owner is a Governmental Body of the State of South Carolina as defined in S.C. Code Ann. § 11-35-310.

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

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

SLED Entrance Road and Water Line Extension
H18-9592-PD-A
Francis Marion Rd, Florence, SC

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

William C. Ervin, Jr., P.E.
341 W Evans St
Florence, SC 29501

The Owner and Contractor agree as follows.

This version of AIA Document A101–2017 is modified by the South Carolina Division of Procurement Services, Office of State Engineer. Publication of this version of AIA Document A101 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement Services, Office of State Engineer. A comparative version of AIA Document A101–2017 showing additions and deletions by the South Carolina Division of Procurement Services, Office of State Engineer is available for review on South Carolina state Web site.

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

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TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

§ 1.1 The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

§ 1.2 Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101-2017 Standard Form of Agreement Between Owner and Contractor, SCOSE Version. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201-2017 General Conditions of the Contract for Construction, SCOSE Version.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The Date of Commencement of the Work shall be the date fixed in a Notice to Proceed issued by the Owner. The Owner shall issue the Notice to Proceed to the Contractor in writing, no less than seven (7) days prior to the Date of Commencement. Unless otherwise provided elsewhere in the Contract Documents and provided the Contractor has secured all required insurance and surety bonds, the Contractor may commence work immediately after receipt of the Notice to Proceed.

§ 3.2 The Contract Time as provided in the Notice to Proceed for this project shall be measured from the Date of Commencement of the Work to Substantial Completion.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work within the Contract Time indicated in the Notice to Proceed.

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

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum, including all accepted alternates indicated in the bid documents, in current funds for the Contractor's performance of the Contract. The Contract Sum shall be

($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates that are accepted, if any, included in the Contract Sum:
(Insert the accepted Alternates.)

Item	Price

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages

§ 4.5.1 Contractor agrees that from the compensation to be paid, the Owner shall retain as liquidated damages the amount indicated in Section 9(b) of the Bid Form for each calendar day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. The liquidated damages amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty.

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect and Owner by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 The Owner shall make payment of the certified amount to the Contractor not later than twenty-one (21) days after receipt of the Application for Payment.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to S.C. Code Ann. § 12-8-550 (Withholding Requirements for Payments to Non-Residents), in accordance with AIA Document A201®–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold three and one-half percent (3.5%), as retainage, from the payment otherwise due.

§ 5.1.7.2 When a portion, or division, of Work as listed in the Schedule of Values is 100% complete, that portion of the retained funds which is allocable to the completed division must be released to the Contractor. No later than ten (10) days after receipt of retained funds from the Owner, the Contractor shall pay to the subcontractor responsible for such completed work the full amount of retainage allocable to the subcontractor's work.

§ 5.1.7.3 Upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7.

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than twenty-one (21) days after the issuance of the Architect's final Certificate for Payment.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Claims and disputes shall be resolved in accordance with Article 15 of AIA Document A201–2017.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

§ 8.2.1 The Owner designates the individual listed below as its Senior Representative ("Owner's Senior Representative"), which individual has the responsibility for and, subject to Section 7.2.1 of the General Conditions, the authority to resolve disputes under Section 15.6 of the General Conditions:

Name: **Ralph U. Davis**
Title: **Vice President for Construction and Facilities**
Address: **4822 E. Palmetto Street Florence, SC 29506**
Telephone: **843-661-1101**
Email: **rdavis@fmarion.edu**

§ 8.2.2 The Owner designates the individual listed below as its Owner's Representative, which individual has the authority and responsibility set forth in Section 2.1.1 of the General Conditions:

Name: **Lee Capotosti**
Title: **Project Manager**
Address: **4822 E. Palmetto Street Florence, SC 29506**
Telephone: **843-661-1309**
Email: **lee.copotosti@fmarion.edu**

§ 8.3 The Contractor's representative:

§ 8.3.1 The Contractor designates the individual listed below as its Senior Representative ("Contractor's Senior Representative"), which individual has the responsibility for and authority to resolve disputes under Section 15.6 of the General Conditions:

Name:

Title:

Address:

Telephone:

Email:

§ 8.3.2 The Contractor designates the individual listed below as its Contractor's Representative, which individual has the authority and responsibility set forth in Section 3.1.1 of the General Conditions:

Name:

Title:

Address:

Telephone:

Email:

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 The Architect's representative:

Name: William C. Ervin, Jr., P.E.

Title: Vice President

Address: 341 W. Evans St Florence, SC 29501

Telephone: 843-662-4941

Email: bill@ervinengineering.com

§ 8.6 Insurance and Bonds

§ 8.6.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101®–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.6.2 The Contractor shall provide bonds as set forth in AIA Document A101®–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.7 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.8 Other Provisions:

§ 8.8.1 Additional requirements, if any, for the Contractor's Construction Schedule are as follows:

(Check box if applicable to this Contract)

☐ The Construction Schedule shall be in a detailed precedence-style critical path management (CPM) or primavera-type format satisfactory to the Owner and the Architect that shall also (1) provide a graphic representation of all activities and events that will occur during performance of the Work; (2) identify each phase of construction and occupancy; and (3) set forth milestone dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents.

.1 Upon review by the Owner and the Architect for conformance with milestone dates and Construction Time given in the Bidding Documents, with associated Substantial Completion date, the Construction Schedule shall be deemed part of the Contract Documents and attached to the Agreement as an Exhibit. If returned for non-conformance, the Construction Schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted.

.2 The Contactor shall monitor the progress of the Work for conformance with the requirements of the Construction Schedule and shall promptly advise the Owner of any delays or potential delays. Whenever the Construction Schedule no longer reflects actual conditions and progress of the Work or the Contract Time is modified in accordance with the terms of the Contract Documents, the Contractor shall update the Construction Schedule to reflect such conditions.

.3 In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary.

.4 In no event shall any progress report constitute an adjustment in the Contract Time, any milestone date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

§ 8.8.2 The Owner's review of the Contractor's schedule is not conducted for the purpose of either determining its accuracy, completeness, or approving the construction means, methods, techniques, sequences or procedures. The Owner's review shall not relieve the Contractor of any obligations.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101®–2017, SCOSE Version Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101®–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201®–2017, SCOSE Version General Conditions of the Contract for Construction

.4 Form SE-390, Notice to Proceed – Construction Contract

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Init.

/

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

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

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

☐ The Sustainability Plan:

Title	Date	Pages

☐ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201®–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

Form SE-310, Invitation for Construction Services
Instructions to Bidders (AIA Document A701-2018 OSE Version)
Form SE-330, Contractor's Bid (Completed Bid Form)
Form SE-370, Notice of Intent to Award
Certificate of Procurement Authority issued by the State Fiscal Accountability Authority

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name, State Project Number, and location or address)

SLED Entrance Road and Water Line Extension
H18-9592-PD-A
Francis Marion Rd, Florence, SC

THE OWNER:
(Name, legal status and address)

Francis Marion University
4822 E. Palmetto St
Florence, SC 29502

The Owner is a Governmental Body of the State of South Carolina as defined by Title 11, Chapter 35 of the South Carolina Code of Laws, as amended.

THE CONTRACTOR:
(Name, legal status and address)

This version of AIA Document A101–2017 Exhibit A is modified by the South Carolina Division of Procurement, Office of State Engineer. Publication of this version of AIA Document A101 Exhibit A does not imply the American Institute of Architects' endorsement of any modification by the South Carolina Division of Procurement, Office of State Engineer.

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

TABLE OF ARTICLES

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201®–2017, General Conditions of the Contract for Construction, SCOSE Version.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

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

§ A.2.3 Reserved

§ A.2.3.1 Reserved

§ A.2.3.1.1 Reserved

§ A.2.3.1.2 Reserved

§ A.2.3.1.3 Reserved

§ A.2.3.1.4 Reserved

§ A.2.3.2 Reserved

§ A.2.3.3 Reserved

§ A.2.4 Optional Insurance.

The Owner shall purchase and maintain any insurance selected below.

☐ **§ A.2.4.1 Other Insurance**

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the

Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.1.4 A failure by the Owner to either (i) demand a certificate of insurance or written endorsement required by Section A.3, or (ii) reject a certificate or endorsement on the grounds that it fails to comply with Section A.3, shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, for such other period for maintenance of completed operations coverage as specified in the Contract Documents, or unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than $1,000,000 each occurrence, $1,000,000 general aggregate, $1,000,000 aggregate for products-completed operations hazard, $1,000,000 personal and advertising injury, $50,000 fire damage (any one fire), and $5,000 medical expense (any one person) providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
.2 personal injury and advertising injury;
.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
.4 bodily injury or property damage arising out of completed operations; and
.5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
.3 Claims for bodily injury other than to employees of the insured.
.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
.8 Claims related to roofing, if the Work involves roofing.
.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
.10 Claims related to earth subsidence or movement, where the Work involves such hazards.
.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than $1,000,000 per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability, Employers Liability, and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers. The umbrella policy limits shall not be less than $3,000,000.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than $100,000 each accident, $100,000 each employee, and $500,000 policy limit for claims, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks.

§ A.3.2.8 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than ($) per claim and ($) in the aggregate.

§ A.3.2.9 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than ($) per claim and ($) in the aggregate.

§ A.3.3 Required Property Insurance

§ A.3.3.1 The Contractor shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Contractor's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.3.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds.

§ A.3.3.1.1 Causes of Loss. The insurance required by this Section A.3.3.1 shall provide coverage for direct physical loss or damage and shall include the risks of fire (with extended coverage), explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, workmanship, or materials.
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.3.3.1.2 Specific Required Coverages. The insurance required by this Section A.3.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. (Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.3.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall replace the insurance policy required under Section A.3.3.1 with property insurance written for the total value of the Project.

§ A.3.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.3.3 is subject to deductibles or self-insured retentions, the Contractor shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.3.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.3.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.3.3.3 If the Owner requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Contractor shall, if possible, include such insurance, and the cost thereof shall be charged to the Owner by appropriate Change Order.

§ A.3.3.4 Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section A.3.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.

§ A.3.4 Contractor's Other Insurance Coverage

§ A.3.4.1 Insurance selected and described in this Section A.3.4 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.4.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.4.1.
(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

☐ **§ A.3.4.2.1 Reserved**

☐ **§ A.3.4.2.2** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

☐ **§ A.3.4.2.3** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

☐ **§ A.3.4.2.4 Boiler and Machinery Insurance**
The Contractor shall purchase and maintain boiler and machinery insurance as required, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this

insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ A.3.5 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	100%
Performance Bond	100%

§ A.3.5.1 Before commencing any services hereunder, the Contractor shall provide the Owner with Performance and Payment Bonds, each in an amount not less than the Contract Price set forth in Article 4 of the Agreement. The Surety shall have, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty". In addition, the Surety shall have a minimum "Best Financial Strength Category" of "Class V", and in no case less than five (5) times the contract amount. The Performance Bond shall be written on Form SE-355, "Performance Bond" and the Payment Bond shall be written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

§ A.3.5.2 The Performance and Labor and Material Payment Bonds shall:

.1 be issued by a surety company licensed to do business in South Carolina;

.2 be accompanied by a current power of attorney and certified by the attorney-in-fact who executes the bond on the behalf of the surety company; and

.3 remain in effect for a period not less than one (1) year following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer.

§ A.3.5.3 Any bonds required by this Contract shall meet the requirements of the South Carolina Code of Laws and Regulations, as amended.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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Cite this document as "AIA Document A201®–2017, General Conditions of the Contract for Construction—SCOSE Version," or "AIA Document A201®–2017 — SCOSE Version."

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name, State Project Number, and location or address)

SLED Entrance Road and Water Line Extension
H18-9592-PD-A
Francis Marion Road Florence, SC

THE OWNER:
(Name, legal status, and address)

Francis Marion University
4822 E. Palmetto St.
Florence, SC 29502

The Owner is a Governmental Body of the State of South Carolina as defined in S.C. Code Ann.§ 11-35-310.

THE ARCHITECT:
(Name, legal status, and address)

William C. Ervin, Jr., P.E.
341 w evans st
Florence, SC 29501

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

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(Topics and numbers in bold are Section headings.)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

.1 The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract.

.2 A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect.

.3 Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

.4 Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101-2017, Standard Form of Agreement Between Owner and Contractor, SCOSE Version.

.5 Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201-2017, General Conditions of the Contract for Construction, SCOSE Version.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Reserved

§ 1.1.9 Notice to Proceed

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The Notice to Proceed is a document issued by the Owner to the Contractor directing the Contractor to begin prosecution of the Work in accordance with the requirements of the Contract Documents. The Notice to Proceed shall fix the date on which the Contract Time will commence and establish the initial date of the Substantial Completion.

§ 1.1.10 State Engineer

"State Engineer" means the person holding the position as head of the State Engineer's Office. The State Engineer's Office is created by S.C. Code Ann. § 11-35-830, and is sometimes referred to in the Contract Documents as "Office of State Engineer" or "OSE." The State Engineer is also the Chief Procurement Officer for Construction, sometimes referred to in the Contract Documents as "CPOC".

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In the event of patent ambiguities within or between parts of the Contract Documents, the Contractor shall 1) provide the better quality or greater quantity of Work, or 2) comply with the more stringent requirement, either or both in accordance with the Architect's interpretation.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, such determination shall not impair or otherwise affect the validity, legality, or enforceability of the remaining provision or parts of the provision of the Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as a violation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to

whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.6.3 Notice to Contractor shall be to the address provided in Section 8.3.2 of the Agreement. Notice to Owner shall be to the address provided in Section 8.2.2 of the Agreement. Either party may designate a different address for notice by giving notice in accordance with Section 1.6.1.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation, including in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, except as provided in Section 7.1.7. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's Representative noted in the Agreement.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen (15) days after receipt of a written request, information necessary and relevant for the Contractor to post Notice of Project Commencement pursuant to S.C. Code Ann. § 29-5-23.

§ 2.2 Reserved

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain a design professional lawfully licensed to practice, or an entity lawfully practicing, in the jurisdiction where the Project is located. The person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Subject to the Contractor's obligations, including those in Section 3.2, the Contractor shall be entitled to rely on the accuracy of information furnished by the Owner pursuant to this Section but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services. However, the Owner does not warrant the accuracy of any such information requested by the Contractor that is not otherwise required of the Owner by the Contract Documents. Neither the Owner nor the Architect shall be required to conduct investigations or to furnish the Contractor with any information concerning subsurface characteristics or other conditions of the area where the Work is to be performed beyond that which is provided in the Contract Documents.

§ 2.3.6 The Owner shall furnish the Contract Documents to the Contractor in digital format.

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect, including but not limited to providing necessary resources, with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

.1 The Contractor acknowledges that it has investigated and satisfied itself as to the general and local conditions which can affect the Work or its cost, including but not limited to (a) conditions bearing upon transportation, disposal, handling, and storage of materials; (b) the availability of labor, water, electric power, and roads; (c) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (d) the conformation and conditions of the ground; and (e) the character of equipment and facilities needed preliminary to and during work performance.

.2 The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is

reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of this Contract.

.3 Any failure of the Contractor to take the actions described and acknowledged in this Section will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the Work, or for proceeding to successfully perform the Work without additional expense to the Owner.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from latent errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction and provide its findings to the Owner. Unless the Owner objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

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

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

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 After the Contract has been executed, the Owner and Architect may consider requests for the substitution of products in place of those specified. The Owner and Architect may, but are not obligated to, consider only those substitution requests that are in full compliance with the conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

.1 represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to the product specified;

.2 represents that it will provide the same warranty for the substitution as it would have provided for the product specified;

.3 certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be performed or changes as a result of the substitution, except for the Architect's re-design costs, and waives all claims for additional costs related to the substitution that subsequently become apparent;

.4 agrees that it shall, if the substitution is approved, coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects; and

.5 represents that the request includes a written representation identifying any potential effect the substitution may have on Project's achievement of a Sustainable Measure or the Sustainable Objective.

§ 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements shall be considered defective. Unless caused by the Contractor or a subcontractor at any tier, the Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Contractor shall comply with the requirements of S.C Code Ann. Title 12, Chapter 8, regarding withholding tax for nonresidents, employees, contractors and subcontractors.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Pursuant to S.C. Code Ann. § 10-1-180, no local general or specialty building permits are required for state buildings. Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for all other permits, fees, and licenses by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual costs, as documented by invoices, and the allowances under Section 3.8.2.1.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent, acceptable to the Owner, and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Owner may notify the Contractor, stating whether the Owner has reasonable objection to the proposed superintendent. Failure of the Owner to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner has made reasonable and timely objection. The Contractor shall notify the Owner of any proposed change in the superintendent, including the reason therefore, prior to making such change. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. Subject to any additional requirements in the Contract Documents, the schedule shall contain detail appropriate for the Project, including at a minimum (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

.1 The fire sprinkler shop drawings shall be prepared by a licensed fire sprinkler contractor and shall accurately reflect actual conditions affecting the required layout of the fire sprinkler system. The fire sprinkler contractor shall certify the accuracy of its shop drawings prior to submitting them for review and approval.

.2 The fire sprinkler shop drawings shall be reviewed and approved by the Architect's engineer of record (EOR) prior to submittal to the Office of State Fire Marshal (OSFM).

.3 The EOR shall submit to OSFM in accordance with the OSFM process.

.4 Unless authorized in writing by OSE, neither the Contractor nor subcontractor at any tier shall submit the fire sprinkler shop drawings directly to OSFM.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, who shall comply with reasonable requirements of the Owner regarding qualifications and insurance and whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to

the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site

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

§ 3.13.2 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but

only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents. Any reference in the Contract Documents to the Architect taking action or rendering a decision with a "reasonable time" is understood to mean no more than ten (10) days, unless otherwise specified in the Contract Documents or otherwise agreed to by the parties.

§ 4.2.2 The Architect will visit the site as necessary to fulfill its obligation to the Owner for inspection services, if any, and, at a minimum, to assure conformance with the Architect's design as shown in the Contract Documents and to observe the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) deviations from the Contract Documents, (2) deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Work completed and correlated with the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will, in the first instance, interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. Upon receipt of such request, the Architect will promptly provide the other party with a copy of the request. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, and will not show partiality to either. Except in the case of interpretations resulting in omissions, defects, or errors in the Instruments of Service or perpetuating omissions, defects or errors in the Instruments of Service, the Architect will not be liable for results of interpretations or decisions rendered in good faith. If either party disputes the Architect's interpretation or decision, that party may proceed as provided in Article 15. The Architect's interpretations and decisions may be, but need not be, accorded any deference in any review conducted pursuant to law or the Contract Documents.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents so as to avoid delay to the construction of the Project. The Architect's response to such requests will be made in writing with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. Any response to a request for information must be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings.

Unless issued pursuant to a Modification, supplemental Drawings or Specifications will not involve an adjustment to the Contract Sum or Contract Time.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, within fourteen (14) days after posting of the Notice of Intent to Award the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Owner may notify the Contractor whether the Owner has reasonable objection to any such proposed person or entity. Failure of the Owner to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Owner shall not direct the Contractor to contract with any specific individual or entity for supplies or services unless such supplies and services are necessary for completion of the Work and the specified individual or entity is the only source of such supply or service.

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

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner makes reasonable objection to such substitution. The Contractor's request for substitution must be made to the Owner in writing, accompanied by supporting information.

§ 5.2.5 A Subcontractor identified in the Contractor's Bid pursuant to the subcontractor listing requirements of Section 7 of the Bid Form may only be substituted in accordance with and as permitted by the provisions of S.C. Code Ann. § 11-35-3021. A proposed substitute for a listed subcontractor shall also be subject to the Owner's approval as set forth in Section 5.2.3.

§ 5.2.6 A Contractor may substitute one prospective subcontractor for another, with the approval of the Owner as follows:

.1 If the Contractor requests the substitution, the Contractor is responsible for all costs associated with the substitution.

.2 If the Owner requests the substitution, the Owner is responsible for any resulting increased costs to the Contractor.

§ 5.3 Subcontractual Relations

§ 5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not

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prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise herein, or in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Without limitation on the generality of Section 5.3.1, each Subcontract agreement and each Sub-subcontract agreement shall include, and shall be deemed to include, the following Sections of these General Conditions: 3.2, 3.5, 3.18, 5.3, 5.4, 6.2.2, 7.1.6, 7.3.3, 7.5, 13.1, 13.9, 14.3, 14.4, and 15.1.7.

§ 5.3.3 Each Subcontract Agreement and each Sub-subcontract agreement shall exclude, and shall be deemed to exclude, Sections 13.2 and 13.5 and all of Article 15, except Section 15.1.7, of these General Conditions. In the place of these excluded sections of the General Conditions, each Subcontract Agreement and each Sub-subcontract may include Sections 13.2 and 13.5 and all of Article 15, except Section 15.1.7, of AIA Document A201-2007, Conditions of the Contract, as originally issued by the American Institute of Architects.

§ 5.3.4 The Contractor shall assure the Owner that all agreements between the Contractor and its Subcontractor incorporate the provisions of Section 5.3.1 as necessary to preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed by Subcontractors so that the subcontracting thereof will not prejudice such rights. The Contractor's assurance shall be in the form of an affidavit or in such other form as the Owner may approve. Upon request, the Contractor shall provide the Owner or Architect with copies of any or all subcontracts or purchase orders.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

§ 5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

§ 5.4.5 Each subcontract shall specifically provide that the Subcontractor agrees to perform portions of the Work assigned to the Owner in accordance with the Contract Documents.

§ 5.4.6 Nothing in this Section 5.4 shall act to reduce or discharge the Contractor's payment bond surety's obligations to claimants for claims arising prior to the Owner's exercise of any rights under this conditional assignment.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to

those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Reserved

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 If a change in the Work provides for an adjustment to the Contract Sum, the amount of such adjustment must be computed and documented in writing. In order to facilitate evaluation of proposals or claims for increases and decreases to the Contract Sum, all proposals or claims, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and subcontracts. Labor and materials shall be itemized. Where major cost items are subcontracts, they shall be itemized also. The amount of the adjustment must approximate the actual cost to the Contractor and all costs incurred by the Contractor must be justifiably compared with prevailing industry standards. Except as provided in Section 7.1.5, all adjustments to the Contract Sum shall be limited to job specific costs and shall not include indirect costs, home office overhead or profit.

§ 7.1.5 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

.1 For the Contractor, for Work performed by the Contractor's own forces, not to exceed seventeen (17%) percent of the Contractor's actual costs.

.2 For the Contractor, for Work performed by the Contractor's Subcontractors, not to exceed ten (10%) percent of each Subcontractor's actual costs (not including the Subcontractor's overhead and profit).

.3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, not to exceed seventeen (17%) percent of the Subcontractor's actual costs.

.4 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.

The percentages cited above shall be considered to include all indirect costs including, but not limited to field and office managers, supervisors and assistants, incidental job burdens, small tools, and general overhead allocations.

§ 7.1.6 The procedures described in Sections 7.1.4 and 7.1.5 shall be used to calculate any adjustment in the Contract Sum, including without limitation an adjustment permitted under Articles 7, 9, 14, or 15.

§ 7.1.7 If a change in the Work requires an adjustment to the Contract Sum that exceeds the limits of the Owner's Construction Change Order Certification (reference Section 9.1.9 of the Agreement), then the Owner's agreement is not effective, and Work may not proceed until approved in writing by the OSE.

§ 7.1.8 Additional Work performed after the declaration of Substantial Completion must be approved by OSE, if the Change Order exceeds the Owner's Construction Change Order Certification.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument, using the OSE Construction Change Order form, prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

.1 The change in the Work;

.2 The amount of the adjustment, if any, in the Contract Sum; and

.3 The extent of the adjustment, if any, in the Contract Time.

Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, any adjustments to the Contract Sum or the Contract Time.

§ 7.2.2 At the Owner's request, the Contractor shall prepare a proposal to perform the work of a proposed Change Order setting forth the amount of the proposed adjustment, if any, in the Contract Sum; and the extent of the proposed adjustment, if any, in the Contract Time. Any proposed adjustment in the Contract Sum shall be prepared in accordance with Section 7.1.4 and 7.1.5. The Owner's request shall include any revisions to the Drawings or Specifications necessary to define any changes in the Work. Within fourteen (14) days of receiving the request, the Contractor shall submit the proposal to the Owner and Architect along with all documentation required by Section 7.5.

§ 7.2.3 If the Contractor requests a Change Order, the request shall set forth the proposed change in the Work and shall be prepared in accordance with Section 7.2.2. If the Contractor requests a change to the Work that involves a revision

to either the Drawings or Specifications, the Contractor shall reimburse the Owner for any expenditure associated with the Architects' review of the proposed revisions, except to the extent the revisions are accepted by execution of a Change Order.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum if properly itemized and substantiating data is not available to permit evaluation;

.2 Unit prices specified in the Contract Documents or subsequently agreed upon, subject to adjustment if any, as provided in Section 9.1.2;

.3 Cost and a percentage fee, calculated as described in Sections 7.1.4 and 7.1.5;

.4 in another manner as the parties may agree; or

.5 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall make an initial determination, consistent with Section 7.3.3, of the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.1.5. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; and

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual cost including overhead and profit as confirmed by the Architect from the Schedule of Values.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The

Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

§ 7.5 Pricing Data and Audit

§ 7.5.1 Cost or Pricing Data

Upon request of the Owner or Architect, Contractor shall submit cost or pricing data prior to execution of a Modification which exceeds $500,000 [Reference S.C. Code Ann. §§ 11-35-1830 and 11-35-2220, and SC Code Ann. Reg 19-445.2120]. Contractor shall certify that, to the best of its knowledge and belief, the cost or pricing data submitted is accurate, complete, and current as of a mutually determined specified date prior to the date of pricing the Modification. Contractor's price, including profit, shall be adjusted to exclude any significant sums by which such price was increased because Contractor furnished cost or pricing data that was inaccurate, incomplete, or not current as of the date specified by the parties. Notwithstanding Subparagraph 9.10.4, such adjustments may be made after final payment to the Contractor.

§ 7.5.2 Cost or pricing data means all facts that, as of the date specified by the parties, prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, not judgmental; and are verifiable. While they do not indicate the accuracy of the prospective contractor's judgment about estimated future costs or projections, they do include the data forming the basis for that judgment. Cost or pricing data are more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred.

§ 7.5.3 Records Retention

As used in Section 7.5, the term "Records" means any books or records that relate to cost or pricing data of a Change Order that Contractor is required to submit pursuant to Section 7.5.1. Contractor shall maintain records for three years from the date of final payment, or longer if requested by the chief procurement officer. The Owner may audit Contractor's records at reasonable times and places.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly commence the Work prior to the effective date of surety bonds and insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time, the Contract Time shall be extended for such reasonable time as the Architect may determine, provided the delay:

.1 is not caused by the fault or negligence of the Contractor or a subcontractor at any tier, and

.2 is not due to unusual delay in the delivery of supplies, machinery, equipment, or services when such supplies, machinery, equipment, or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

§ 9.2.1 The Contractor shall submit a schedule of values to the Architect within ten (10) days of full execution of the Agreement, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.2.2 As requested by the Architect, the Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible. The breakdown, being submitted on a uniform standardized format approved by the Architect and Owner, shall be divided in detail, using convenient units, sufficient to accurately determine the value of completed Work during the course of the Project. The Contractor shall update the schedule of values as required by either the Architect or Owner as necessary to reflect:

.1 the description of Work (listing labor and material separately);

.2 the total value of the Work;

.3 the percent and value of the Work completed to date;

.4 the percent and value of previous amounts billed; and

.5 the current percent completed, and amount billed.

§ 9.2.3 Any schedule of values or trade breakdown that fails to provide sufficient detail, is unbalanced, or exhibits "front-loading" of the value of the Work shall be rejected. If a schedule of values or trade breakdown is used as the basis for payment and later determined to be inaccurate, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work.

§ 9.3 Applications for Payment

§ 9.3.1 Monthly, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require (such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers), and shall reflect retainage as provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing, provided such materials or equipment will be subsequently incorporated in the Work. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site. The Contractor shall 1) protect such materials from diversion, vandalism, theft, destruction, and damage, 2) mark such materials specifically for use on the Project, and 3) segregate such materials from other materials at the storage facility. The Architect and the Owner shall have the right to make inspections of the storage areas at any time.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated in both the Application for Payment and, if required to be submitted, the accompanying current construction schedule, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means,

methods, techniques, sequences, or procedures; or (3) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect shall withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. The Architect shall withhold a Certificate of Payment if the Application for Payment is not accompanied by the current construction schedule required by Section 3.10.1. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

.1 defective Work not remedied;

.2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;

.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or a Separate Contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 Pursuant to S.C. Ann. §§ 29-6-10 through 29-6-60, the Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment to the Owner, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the time established in the Contract Documents, the amount certified by the Architect or awarded by final dispute resolution order, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive written list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect, the Owner, and any other party the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to determine whether the Work or designated portion thereof is substantially complete. The Contractor shall furnish access for the inspection and testing as provided in this Contract. The inspection shall include a demonstration by the Contractor that all equipment, systems and operable components of the Work function properly and in accordance with the Contract Documents.

.1 If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

.2 If more than one Substantial Completion inspection is required, the Contractor shall reimburse the Owner for all costs of re-inspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.

.3 Representatives of the State Fire Marshal's Office and other authorities having jurisdiction may be present at the Substantial Completion inspection or otherwise inspect the completed Work and advise the Owner whether the Work meets their respective requirements for the Project.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner for its written acceptance of responsibilities assigned in the Certificate and a copy of the signed Certificate shall be delivered to the Contractor. Upon such acceptance, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 If the Architect and Owner concur in the Contractor's assessment that the Work or a portion of the Work is safe to occupy, the Owner and Contractor may arrange for a Certificate of Occupancy inspection by OSE. The Owner, Architect, and Contractor shall be present at OSE's inspection. Upon verifying that the Work or a portion of the Work is substantially complete and safe to occupy, OSE will issue, as appropriate, a Full or Partial Certificate of Occupancy.

§ 9.8.7 The Owner may not occupy the Work until all required occupancy permits, if any, have been issued and delivered to the Owner.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Unless the parties agree otherwise in the Certificate of Substantial Completion, the Contractor shall achieve Final Completion within thirty days after Substantial Completion. Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect, the Owner, and any other party the Architect or the Owner choose will make an inspection on a date and at a time mutually agreeable. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

.1 If more than one Final Completion inspection is required, the Contractor shall reimburse the Owner for all costs of re-inspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.

.2 If the Contractor does not achieve Final Completion within thirty days after Substantial Completion or the timeframe agreed to by the parties in the Certificate of Substantial Completion, whichever is

greater, the Contractor shall be responsible for any additional Architectural fees resulting from the delay.

.3 If OSE has not previously issued a Certificate of Occupancy for the entire Project, the Parties shall arrange for a representative of OSE to participate in the Final Completion inspection.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect:

.1 an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied,

.2 a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect,

.3 a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents,

.4 consent of surety, if any, to final payment,

.5 documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties,

.6 if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner,

.7 required Training Manuals,

.8 equipment Operations and Maintenance Manuals,

.9 any certificates of testing, inspection or approval required by the Contract Documents and not previously provided, and

10. one copy of the Documents required by Section 3.11.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is delayed 60 days through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

.1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract Documents;

.3 terms of special warranties required by the Contract Documents; or

.4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those specific claims in stated amounts that have been previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

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

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance which was not discoverable as provided in Section 3.2.1 and not addressed in the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons or serious loss to real or personal property resulting from such a material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition. Hazardous materials or substances are those hazardous, toxic, or radioactive materials or substances subject to regulations by applicable governmental authorities having jurisdiction, such as, but not limited to, the S.C. Department of Health and Environmental Control, the U.S. Environmental Protection Agency, and the U.S. Nuclear Regulatory Commission.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will

promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up. In the absence of agreement, the Architect will make an interim determination regarding any delay or impact on the Contractor's additional costs. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the rights of either party to disagree and assert a Claim in accordance with Article 15.

§ 10.3.3 The Work in the affected area shall be resumed immediately following the occurrence of any one of the following events: (a) the Owner causes remedial work to be performed that results in the absence of hazardous materials or substances; (b) the Owner and the Contractor, by written agreement, decide to resume performance of the Work; or (c) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or as evidenced by a written report to both the Owner and the Contractor, which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 In addition to its obligations under Section 3.18, the Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 Reserved

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7. The Contractor shall immediately give the Owner and Architect notice of the emergency. This initial notice may be oral followed within five (5) days by a written notice setting forth the nature and scope of the emergency. Within fourteen (14) days of the start of the emergency, the Contractor shall give the Architect a written estimate of the cost and probable effect of delay on the progress of the Work.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Failure to Purchase Required Property Insurance. If the Contractor fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the

Contract Documents, the Contractor shall inform the Owner in writing prior to commencement of the Work. Upon receipt of notice from the Contractor, the Owner may delay commencement of the Work and may obtain insurance that will protect the interests of the Owner in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall not be equitably adjusted. In the event the Contractor fails to procure coverage, the Contractor waives all rights against the Owner to the extent the loss to the Contractor (including Subcontractors and Sub-subcontractors) would have been covered by the insurance to have been procured by the Contractor. The cost of the insurance shall be charged to the Contractor by a Change Order. If the Contractor does not provide written notice, and the Owner is damaged by the failure or neglect of the Contractor to purchase or maintain the required insurance, the Contractor shall reimburse the Owner for all reasonable costs and damages attributable thereto.

§ 11.1.5 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner and all additional insureds of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Owner: (1) the Owner, upon receipt of notice from the Contractor, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall not be equitably adjusted; and (3) the Contractor waives all rights against the Owner to the extent any loss to the Contractor, Subcontractors, and Sub-subcontractors would have been covered by the insurance had it not expired or been cancelled. If the Owner purchases replacement coverage, the cost of the insurance shall be charged to the Contractor by an appropriate Change Order. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Reserved

§ 11.2.3 Reserved

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.3.3 Limitation on the Owner's Waiver of Subrogation

South Carolina law prohibits the State from indemnifying a private party. Accordingly, and notwithstanding anything in the Agreement to the contrary, including but not limited to Sections 11.3.1, 11.3.2. and 11.4, the Owner cannot and

does not waive subrogation to the extent any losses are covered by insurance provided by the South Carolina Insurance Reserve Fund.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Contractors as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Contractor shall pay the Architect and Owner their just shares of insurance proceeds received by the Contractor, and by appropriate agreements the Architect and Owner shall make payments to their consultants and separate contractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Contractor shall notify the Owner of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Owner shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Owner does not object, the Contractor shall settle the loss and the Owner shall be bound by the settlement and allocation. Upon receipt, the Contractor shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Owner timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Contractor may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

§ 11.5.3 If required in writing by a party in interest, the Contractor as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the requirements specifically expressed in the Contract Documents, including inspections of work-in-progress required by all authorities having jurisdiction over the Project, it must, upon demand of the Architect or authority having jurisdiction, be uncovered for observation/inspection and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense unless the condition was caused by the Owner or a Separate Contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

.1 If the Contractor, a Subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2 unless otherwise provided in the Contract Documents.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

§ 13.1.1 The Contract, any dispute, claim, or controversy relating to the Contract, and all the rights and obligations of the parties shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina, except its choice of law rules.

§ 13.1.2 This Contract is formed pursuant to and governed by the South Carolina Consolidated Procurement Code and is deemed to incorporate all applicable provisions thereof and the ensuing regulations.

§ 13.2 Successors and Assigns

The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole, or in part, without written consent of the other and then only in accordance with and as permitted by Regulation 19-445.2180 of the South Carolina Code of Regulations, as amended. If either party attempts

to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.3 Rights and Remedies

§ 13.3.1 Unless expressly provided otherwise, duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.3.3 Notwithstanding Section 9.10.4, the rights and obligations which, by their nature, would continue beyond the termination, cancellation, rejection, or expiration of this contract shall survive such termination, cancellation, rejection, or expiration, including, but not limited to, the rights and obligations created by the following clauses:

1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service;
3.5 Warranty
3.17 Royalties, Patents and Copyrights
3.18 Indemnification
7.5 Pricing Data and Audit
A.3.2.2 Contractor's Liability Insurance (A101, Exhibit A)
A.3.5 Performance and Payment Bond (A101, Exhibit A)
15.1.7 Claims for Listed Damages
15.1.8 Waiver of Claims Against the Architect
15.6 Dispute Resolution
15.6.5 Service of Process

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Owner and Architect timely notice of when and where tests and inspections are to be made so that they may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

.1 Inspection, Special Inspections, and testing requirements, if any, as required by the ICC series of Building Codes shall be purchased by the Owner.

.2 Contractor shall schedule and request inspections in an orderly and efficient manner and shall notify the Owner whenever the Contractor schedules an inspection. Contractor shall be responsible for the cost of inspections scheduled and conducted without the Owner's knowledge and for any increase in the cost of inspections resulting from the inefficient scheduling of inspections.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Owner and Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense and shall be deducted from future Applications of Payment.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due to the Contractor and unpaid under the Contract Documents shall bear interest only if and to the extent allowed by S.C. Code Ann. §§ 29-6-10 through 29-6-60. Amounts due to the Owner shall bear interest at the rate of one percent a month or a pro rata fraction thereof on the unpaid balance as may be due.

§ 13.6 Procurement of Materials by Owner

The Contractor accepts assignment of all purchase orders and other agreements for procurement of materials and equipment by the Owner that are identified as part of the Contract Documents. The Contractor shall, upon delivery, be responsible for the storage, protection, proper installation, and preservation of such Owner purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. Unless the Contract Documents specifically provide otherwise, all Contractor warranty of workmanship and correction of the Work obligations under the Contract Documents shall apply to the Contractor's installation of and modifications to any Owner purchased items.

§ 13.7 Interpretation of Building Codes

As required by S.C. Code Ann. § 10-1-180, OSE shall determine the enforcement and interpretation of all building codes and referenced standards on state buildings. The Contractor shall refer any questions, comments, or directives from local officials to the Owner and OSE for resolution.

§ 13.8 Minority Business Enterprises

Contractor shall notify Owner of each Minority Business Enterprise (MBE) providing labor, materials, equipment, or supplies to the Project under a contract with the Contractor. Contractor's notification shall be via the first monthly status report submitted to the Owner after execution of the contract with the MBE. For each such MBE, the Contractor shall provide the MBE's name, address, and telephone number, the nature of the work to be performed or materials or equipment to be supplied by the MBE, whether the MBE is certified by the South Carolina Office of Small and Minority Business Assistance, and the value of the contract.

§ 13.9 Illegal Immigration

Contractor certifies and agrees that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractor's language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractor's language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at www.procurement.sc.gov)

§ 13.10 Drug-Free Workplace

The Contractor must comply with the Drug-Free Workplace Act, S.C. Code Ann. §§ 44-107-10, et seq. The Contractor certifies to the Owner that Contractor will provide a Drug-Free Workplace, as defined by S.C. Code Ann. § 44-107-20(1).

§ 13.11 False Claims

According to S.C. Code Ann. § 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty" of a crime.

§ 13.12 Prohibited Acts

It is unlawful for a person charged with disbursements of state funds appropriated by the General Assembly to exceed the amounts and purposes stated in the appropriations. (§ 11-9-20) It is unlawful for an authorized public officer to enter into a contract for a purpose in which the sum is in excess of the amount appropriated for that purpose. It is unlawful for an authorized public officer to divert or appropriate the funds arising from any tax levied and collected for any one fiscal year to the payment of an indebtedness contracted or incurred for a previous year. (§ 11-1-40)

§ 13.13 Open Trade (Jun 2015)

During the contract term, including any renewals or extensions, Contractor will not engage in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in S.C. Code Ann. § 11-35-5300.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 45 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

.1 Issuance of an order of a court or other public authority having jurisdiction that requires substantially all Work to be stopped; or

.2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents and the Contractor has stopped work in accordance with Section 9.7.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials, or otherwise fails to prosecute the Work, or any separable part of the Work, with the diligence, resources and skill that will ensure its completion within the time specified in the Contract Documents, including any authorized adjustments;

.2 fails to make payment to Subcontractors or suppliers in accordance with the Contract Documents and the respective agreements between the Contractor and the Subcontractors or suppliers;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
.2 Accept assignment of subcontracts pursuant to Section 5.4; and
.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.2.5 If, after termination for cause, it is determined that the Owner lacked justification to terminate under Section 14.2.1, or that the Contractor's default was excusable, or that the termination for cause was affected by any other error, then Owner and Contractor agree that the termination shall be conclusively deemed to be one for the convenience of the Owner, and the rights and obligations of the parties shall be the same as if the termination had been issued for in Section 14.4.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. No adjustment shall be made to the extent
.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. The Owner shall give notice of the termination to the Contractor specifying the part of the Contract terminated and when termination becomes effective.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall
.1 cease operations as directed by the Owner in the notice;
.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;
.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders; and
.4 complete the performance of the Work not terminated, if any.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and any other adjustments otherwise set forth in the Agreement.

§ 14.4.4 Contractor's failure to include an appropriate termination for convenience clause in any subcontract shall not (i) affect the Owner's right to require the termination of a subcontract, or (ii) increase the obligation of the Owner beyond what it would have been if the subcontract had contained an appropriate clause.

§ 14.4.5 Upon written consent of the Contractor, the Owner may reinstate the terminated portion of this Contract in whole or in part by amending the notice of termination if it has been determined that:
.1 the termination was due to withdrawal of funding by the General Assembly, Governor, or State Fiscal Accountability Authority or the need to divert project funds to respond to an emergency as defined by Regulation 19-445.2110(B) of the South Carolina Code of Regulations, as amended;

.2 funding for the reinstated portion of the Work has been restored;
.3 circumstances clearly indicate a requirement for the terminated Work; and
.4 reinstatement of the terminated work is advantageous to the Owner.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. A voucher, invoice, payment application or other routine request for payment that is not in dispute when submitted is not a Claim under this definition. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Reserved

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Architect. Such notice shall include sufficient information to advise the Architect and other party of the circumstances giving rise to the Claim, the specific contractual adjustment or relief requested and the basis of such request. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later except as stated for adverse weather days in Section 15.1.6.2. By failing to give written notice of a Claim within the time required by this Section, a party expressly waives its Claim.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Architect is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, including any administrative review allowed under Section 15.6, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Architect's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. Claims for an increase in the Contract Time shall be based on one additional calendar day for each full calendar day that the Contractor is prevented from working.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

.1 Claims for adverse weather shall be based on actual weather conditions at the job site or other place of performance of the Work, as documented in the Contractor's job site log.

.2 For the purpose of this Contract, a total of five (5) days per calendar month (non-cumulative) shall be anticipated as "adverse weather" at the job site, and such time will not be considered justification for an extension of time. If, in any month, adverse weather develops beyond the five (5) days, the Contractor shall be allowed to claim additional days to compensate for the excess weather delays only to the extent of the impact on the approved construction schedule and days the Contractor was already scheduled to work. The remedy for this condition is for an extension of time only and is exclusive of all other rights and remedies available under the Contract Documents or imposed or available by law.

.3 The Contractor shall submit monthly with their pay application all Claims for adverse weather conditions that occurred during the previous month. The Architect shall review each monthly submittal in accordance with Section 15.5 and inform the Contractor and the Owner promptly of its evaluation. Approved days shall be included in the next Change Order issued by the Architect. Adverse weather conditions not claimed within the time limits of this Subparagraph shall be considered to be waived by the Contractor. Claims will not be allowed for adverse weather days that occur after the scheduled (original or adjusted) date of Substantial Completion.

§ 15.1.6.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the work, and the number of days increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.6.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.7 Claims for Listed Damages

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor and Owner waive Claims against each other for listed damages arising out of or relating to this Contract.

§ 15.1.7.1 For the Owner, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) costs suffered by a third party unable to commence work, (vi) attorney's fees, (vii) any interest, except to the extent allowed by Section 13.5 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency.

§ 15.1.7.2 For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest, except to the extent allowed by Section 13.5 (Interest); (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waive as against the Owner. Without limitation, this mutual waiver is applicable to all damages due to either party's termination in accordance with Article 14.

§ 15.1.7.3 Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

§ 15.1.8 Waiver of Claims Against the Architect

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against the Architect and any other design professionals who provide design and/or project management services to the Owner, either directly or as independent contractors or subcontractors to the Architect, for listed damages arising out of or relating to this Contract. The listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest; (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waive as against the Owner. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

§ 15.2 Reserved

§ 15.3 Reserved

§ 15.4 Reserved

§ 15.5 Claim and Disputes - Duty of Cooperation, Notice, and Architects Initial Decision

§ 15.5.1 Contractor and Owner are fully committed to working with each other throughout the Project to avoid or minimize Claims. To further this goal, Contractor and Owner agree to communicate regularly with each other and the Architect at all times notifying one another as soon as reasonably possible of any issue that if not addressed may cause loss, delay, and/or disruption of the Work. If Claims do arise, Contractor and Owner each commit to resolving such Claims in an amicable, professional, and expeditious manner to avoid unnecessary losses, delays, and disruptions to the Work.

§ 15.5.2 Claims shall first be referred to the Architect for initial decision. An initial decision shall be required as a condition precedent to resolution pursuant to Section 15.6 of any Claim arising prior to the date of final payment, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered, or after all the Architect's requests for additional supporting data have been answered, whichever is later. The Architect will not address Claims between the Contractor and persons or entities other than the Owner.

§ 15.5.3 The Architect will review Claims and within ten days of the receipt of a Claim (1) request additional supporting data from the claimant or a response with supporting data from the other party or (2) render an initial decision in accordance with Section 15.5.5.

§ 15.5.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Architect when the response or supporting data will be furnished or (3) advise the Architect that all supporting data has already been provided. Upon receipt of the response or supporting data, the Architect will render an initial decision in accordance with Section 15.5.5.

§ 15.5.5 The Architect will render an initial decision in writing; (1) stating the reasons therefor; and (2) notifying the parties of any change in the Contract Sum or Contract Time or both. The Architect will deliver the initial decision to the parties within two weeks of receipt of any response or supporting data requested pursuant to Section 16.4 or within such longer period as may be mutually agreeable to the parties. If the parties accept the initial decision, the Architect shall prepare a Change Order with appropriate supporting documentation for the review and approval of the parties and the Office of State Engineer. If either the Contractor, Owner, or both, disagree with the initial decision, the Contractor and Owner shall proceed with dispute resolution in accordance with the provisions of Section 15.6.

§ 15.5.6 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.6 Dispute Resolution

§ 15.6.1 If a Claim is not resolved pursuant to Section 15.5 to the satisfaction of either party, both parties shall attempt to resolve the dispute at the field level through discussions between Contractor's Representative and Owner's Representative. If a dispute cannot be resolved through Contractor's Representative and Owner's Representative, then the Contractor's Senior Representative and the Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than twenty-one (21) days after such a request is made, to attempt to resolve such dispute. Prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute. The meetings required by this Section are a condition precedent to resolution pursuant to Section 15.6.2.

§ 15.6.2 If after meeting in accordance with the provisions of Section 15.6.1, the Senior Representatives determine that the dispute cannot be resolved on terms satisfactory to both the Contractor and the Owner, then either party may submit the dispute by written request to South Carolina's Chief Procurement Officer for Construction (CPOC). Except as otherwise provided in Article 15, all Claims, or controversies relating to the Contract shall be resolved exclusively by the appropriate Chief Procurement Officer in accordance with Title 11, Chapter 35, Article 17 of the

South Carolina Code of Laws, or in the absence of jurisdiction, only in the Court of Common Pleas for, or in the absence of jurisdiction a federal court located in, Richland County, State of South Carolina. Contractor agrees that any act by the State regarding the Contract is not a waiver of either the State's sovereign immunity or the State's immunity under the Eleventh Amendment of the United States Constitution.

§ 15.6.3 If any party seeks resolution to a dispute pursuant to Section 15.6.2, the parties shall participate in non-binding mediation to resolve the Claim. If the Claim is governed by Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws as amended and the amount in controversy is $100,000.00 or less, the CPOC shall appoint a mediator, otherwise, the mediation shall be conducted by an impartial mediator selected by mutual agreement of the parties, or if the parties cannot so agree, a mediator designated by the American Arbitration Association ("AAA") pursuant to its Construction Industry Mediation Rules. The mediation will be governed by and conducted pursuant to a mediation agreement negotiated by the parties or, if the parties cannot so agree, by procedures established by the mediator.

§ 15.6.4 Without relieving any party from the other requirements of Sections 15.5 and 15.6, either party may initiate proceedings in the appropriate forum prior to initiating or completing the procedures required by Sections 15.5 and 15.6 if such action is necessary to preserve a claim by avoiding the application of any applicable statutory period of limitation or repose.

§ 15.6.5 Service of Process

Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any Claims, or controversies relating to the Contract; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided for the Contractor's Senior Representative or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

ARTICLE 16 PROJECT-SPECIFIC REQUIREMENTS AND INFORMATION

SE-355
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____

Address: _____

_____

hereinafter referred to as "Contractor", and *(Insert full name and address of principal place of business of Surety)*

Name: _____

Address: _____

_____

hereinafter called the "surety", are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: Francis Marion University

Address: 4822 East Palmetto Street

Florence, SC 29506

hereinafter referred to as "Agency", or its successors or assigns, the sum of _____ ($), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: SLED Entrance Road and Water Line Extenstion

State Project Number: H18-9592-PD-A

Brief Description of Awarded Work: Site works and grading work associated with the SLED building entrance road extension and water line extension on Francis Marion Road.

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: Ervin Engineering Conpany .

Address: P.O. Box 3

Florence, SC 29503

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ **day of** _____**,** 2024 *(shall be no earlier than Date of Contract)*

BOND NUMBER _____

CONTRACTOR	**SURETY**
By: _____ **(Seal)**	**By:** _____ **(Seal)**
Print Name: _____	**Print Name:** _____
Print Title: _____	**Print Title:** _____ *(Attach Power of Attorney)*
Witness: _____	**Witness:** _____

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

SE-355
PERFORMANCE BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency for the full and faithful performance of the contract, which is incorporated herein by reference.

2. If the Contractor performs the contract, the Surety and the Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. The Surety's obligation under this Bond shall arise after:

3.1 The Agency has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Agency is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If the Agency, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Agency's right, if any, subsequently to declare a Contractor Default; or

3.2 The Agency has declared a Contractor Default and formally terminated the Contractor's right to complete the Contract.

4. The Surety shall, within 15 days after receipt of notice of the Agency's declaration of a Contractor Default, and at the Surety's sole expense, take one of the following actions:

4.1 Arrange for the Contractor, with consent of the Agency, to perform and complete the Contract; or

4.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Agency for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Agency and the contractor selected with the Agency's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the Agency the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Agency resulting from the Contractor Default; or

4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and:

4.4.1 After investigation, determine the amount for which it may be liable to the Agency and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Agency; or

4.4.2 Deny liability in whole or in part and notify the Agency, citing the reasons therefore.

5. Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Agency shall pay the Balance of the Contract Sum to either:

5.1 Surety in accordance with the terms of the Contract; or

5.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

5.3 The balance of the Contract Sum due either the Surety or another contractor shall be reduced by the amount of damages as described in paragraph 7.

6. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond 15 days after receipt of written notice from the Agency to the Surety demanding that the Surety perform its obligations under this Bond, and the Agency shall be entitled to enforce any remedy available to the Agency.

6.1 If the Surety proceeds as provided in paragraph 4.4 and the Agency refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Agency shall be entitled to enforce any remedy available to the Agency.

6.2 Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the Dispute Resolution process defined in the Contract Documents and the laws of the State of South Carolina.

7. After the Agency has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Agency shall be those of the Contractor under the Contract, and the responsibilities of the Agency to the Surety shall those of the Agency under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Agency of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Agency without duplication for:

7.1 The responsibilities of the Contractor for correction of defective Work and completion of the Contract; and

7.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

7.3 Damages awarded pursuant to the Dispute Resolution Provisions of the Contract. Surety may join in any Dispute Resolution proceeding brought under the Contract and shall be bound by the results thereof; and

7.4 Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. The Surety shall not be liable to the Agency or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or set-off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Agency or its heirs, executors, administrators, or successors.

9. The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.

10. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the address shown on the signature page.

11. Definitions

11.1 Balance of the Contract Sum: The total amount payable by the Agency to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Agency in settlement of insurance or other Claims for damages to which the Contractor si entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.

11.2 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

SE-357
LABOR & MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____

Address: _____

_____

hereinafter referred to as "Contractor", and *(Insert full name and address of principal place of business of Surety)*

Name: _____

Address: _____

_____

hereinafter called the "surety", are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: Francis Marion University

Address: 4822 East Palmetto Street

Florence, SC 29506

hereinafter referred to as "Agency", or its successors or assigns, the sum of _____ ($), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: SLED Entrance Road and Water Line Extension

State Project Number: H18-9592-PD-A

Brief Description of Awarded Work: Sitework associated with grading and drainage for the SLED building Entrance Road and Water Line Extension

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: Erving Engineering Company

Address: P.O. Box 3

Florence, SC 29503

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Labor & Material Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ day of _____, 224 **BOND NUMBER** _____

(shall be no earlier than Date of Contract)

CONTRACTOR	**SURETY**
By: _____ **(Seal)**	**By:** _____ **(Seal)**
Print Name: _____	**Print Name:** _____
Print Title: _____	**Print Title:** _____ *(Attach Power of Attorney)*
Witness: _____	**Witness:** _____

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

SE-357
LABOR & MATERIAL PAYMENT BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the Agency, this obligation shall be null and void if the Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants; and

2.2 Defends, indemnifies and holds harmless the Agency from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.

3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4. With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:

4.1 Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.

4.2 A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.

4.3 Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of o ne year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.

5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

5.1 Send an answer to the Claimant, with a copy to the Agency, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

5.2 Pay or arrange for payment of any undisputed amounts.

5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.

6. Amounts owed by the Agency to the Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Agency accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Agency's prior right to use the funds for the completion of the Work.

7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

9. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

10. By the Contractor furnishing and the Agency accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

11. Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

12. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.

13. **DEFINITIONS**

13.1 Claimant: An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.

13.2 Remote Claimant: A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.

13.3 Contract: The agreement between the Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

SE-380 **CHANGE ORDER NO.:**_____

CHANGE ORDER TO DESIGN-BID-BUILD CONTRACT

AGENCY: Francis Marion University

PROJECT NAME: SLED Entrance Road and Water Line Extension

PROJECT NUMBER: H18-9592-PD-A

CONTRACTOR: _____

This Contract is changed as follows: *(Insert description of change in space provided below.)*

ADJUSTMENTS IN THE CONTRACT SUM:

1.	**Original Contract Sum:**		$
2.	**Change in Contract Sum by previously approved Change Orders:**		
3.	**Contract Sum prior to this Change Order:**		$ 0.00
4.	**Amount of this Change Order:**		
5.	**New Contract Sum, including this Change Order:**		$ 0.00

ADJUSTMENTS IN THE CONTRACT TIME:

1.	**Initial Date for Substantial Completion:**		
2.	**Sum of previously approved increases and decreases in Days:**		Days
3.	**Change in Days for this Change Order:**		Days
4.	**Total Number of Days added to this Contract including this Change Order:**	0 Days	
5.	**New Date for Substantial Completion:**		

AGENCY ACCEPTANCE AND CERTIFICATION:

I certify that the Agency has authorized, unencumbered funds available for obligation to this contract.

BY:_____ **Date:**_____

(Signature of Representative)

Print Name of Representative:_____

Change is within Agency Construction Contract Change Order Certification of: **$**_____ **Yes** ☐ **No** ☐

APPROVED BY:_____ **DATE:** _____

(OSE Project Manager)

SUBMIT THE FOLLOWING TO OSE

1. SE-380, completed and signed by the Agency.
2. SE-380, Page 2, completed and signed by the Contractor, A/E and Agency, with back-up information to support request.

SE-380, Page 2 **CHANGE ORDER REQUEST NO.:**_____

CHANGE ORDER REQUEST SUMMARY – DESIGN-BID-BUILD

AGENCY: Francis Marion University

PROJECT NAME: SLED Entrance Road and Water Line Extension

PROJECT NUMBER: H18-9592-PD-A

CONTRACTOR: _____

This Contract is requested to be changed as follows: *(Insert description of change in space provided below.)*

ADJUSTMENTS IN THE CONTRACT TIME: Requested Change in Days for this Change Order:_____Days

			(1) Contractor	(2) Subcontractor	(3) TOTAL
Direct Costs (Provide back-up, including hourly rates, invoices, manhours, etc.)	**1.**	Labor			
	2.	Materials (including Sales Tax)			
	3.	Rental Charges			
	4.	Subtotal Direct Costs (sum lines 1 – 3)	**$ 0.00**	**$ 0.00**	**$ 0.00**
Contractor Markup (per AIA A201, Section 7.1.5)	**5.**	Contractor OH&P (not to exceed 17% of line 4, col 1)			
	6.	Subcontractor's OH&P (not to exceed 17% of line 4, col 2)			
	7.	Contractor markup on Subcontractor (not to exceed 10% of line 4, col 2)			
	8.	Total Contractor Markup (sum lines 5 – 7)	**$ 0.00**	**$ 0.00**	**$ 0.00**
Additional Bonding, Insurance and Permit Costs Associated with Change Order	**9.**	Bonds			
	10.	Insurance			
	11.	Permits, Licenses or Fees			
	12.	Subtotal (sum lines 9 – 11)	**$ 0.00**	**$ 0.00**	**$ 0.00**
TOTAL	**13.**	Change Order Cost (sum lines 4, 8, 12, col 3)			**$ 0.00**

ADJUSTMENTS IN THE CONTRACT SUM: Amount of this Change Order Request: **$**_____

CONTRACTOR ACCEPTANCE:

BY:_____ **Date:**_____
(Signature of Representative)
Print Name of Representative:_____

A/E RECOMMENDATION FOR ACCEPTANCE:

BY:_____ **Date:**_____
(Signature of Representative)
Print Name of Representative:_____

AGENCY ACCEPTANCE:

BY:_____ **Date:**_____
(Signature of Representative)
Print Name of Representative:_____

Instruction to Contractor: Attach documentation as needed to justify the requested change to the contract and submit to A/E or Agency.

TECHNICAL SPECIFICATIONS FOR CIVIL SITE WORK

SLED ENTRANCE ROAD AND WATER LINE EXTENSION
OSE PROJECT NO.: H19-9592-PD-A

Florence, South Carolina

EECO # 2023M18001

ERVIN ENGINEERING CO., INC.
ENGINEERS - SURVEYORS - PLANNERS

Table of Contents

Technical Specifications

SECTION 017401
CLEAN UP

Part 1 -

1.1 General

.1.1 Immediately after completion of the work or any substantial unit or portion of it, the contractor shall remove all unused material, refuse and dirt placed by him in the vicinity of the work and shall leave the premises in a neat and orderly condition, satisfactory to the Engineer.

A. Site: The contractor shall clean up behind the work as much as is reasonably possible as the work progresses. Upon completion of the work, and before acceptance of, and final payment for the project by the owner, the contractor shall remove all of his surplus and discarded materials, excavated material and rubbish from the roadways, sidewalks, parking areas, lawns and all adjacent property; shall restore in an acceptable manner, all property, both public and private which has been disturbed or damaged during the prosecution of the work; and shall leave the whole site in a neat and presentable condition.
Where work is along streets or highways and dirt has been placed on the pavement, the pavement shall be swept clean of all dirt after backfill has been completed.
All equipment, trailers, temporary utilities and buildings belonging to the contractor shall be removed from the job site.

B. Building: Clean up operations shall consistently be carried only the contractor to keep the premises free at all times from an accumulation of waste materials and rubbish. Upon completion of the work, he shall remove all rubbish, tools, scaffolding, surplus materials, etc., from the building and shall leave his work in a condition satisfactory to the Engineer. The general construction contractor shall do the following special cleaning for all trades upon completion of the work:

1. Remove putty stains and paint from glass and wash and polish all glass. Do not scratch or otherwise damage glass.

2. Remove all marks, stains, fingerprints and other soil and dirt from painted, stained and decorated work.

3. Remove all temporary protections and clean and polish floors.

4. Clean and polish all hardware for all trades. This shall include removal of all stains, dust, dirt, paint, etc.

C. Pipelines: Clean up along pipelines shall be accomplished as the work progresses. In no case shall more than 1,000 feet of pipeline be left in an "un-cleaned up"
condition. Any barricades or construction signs necessary for safety shall be left in place and maintained until the site, slopes, grass, etc. have stabilized.

SECTION 310523
SITEWORK CONCRETE

310523.1 GENERAL

.1.1 Concrete shall be placed to the lines and grades shown on the plans.

310523.2 MATERIALS

.2.1 All poured in place concrete shall be plant mixed in accordance with ASTM C-94 unless otherwise approved in writing by the engineer. Cement shall be American Portland Cement, ASTM C-150 - Type 1. Air entraining concrete shall conform to ASTM C-175.

.2.2 Fine and coarse aggregate shall be as shown in the approved design mix and shall be in full accordance with ASTM C-33.

.2.3 Air entraining admixtures shall be as specified in ASTM C-260. Retarding admixtures shall comply with ASTM C-494 -Type D.

.2.4 The following list of specifications are applicable to the concrete materials to be incorporated into the job.

ASTM Specification Number Title

C-31 Standard Method of Making and Curing Concrete Compression and Flexure Test Specimens in the field

C-39 Standard Method of Test for Compressive Strength of Molded Concrete Cylinders

C-42 Standard Methods of Securing, Preparing and Testing Specimens from Hardened Concrete for Compressive and Flexural strengths

C-192 Standard Method of Making and Concrete Compression and Flexure Test Specimens in the Laboratory

C-260 Specifications for Air Entraining Admixtures for Concrete

.2.5 Reinforcing steel shall be grade 60, conforming to ASTM A615. All reinforcing steel shall be shop fabricated in accordance with approved shop drawings. Shop drawings in conformance with CRSI shall be submitted to the engineer for all reinforcing steel. Written approval shall be obtained from the Engineer before fabrication.

.2.6 Accessories including chairs, supports, and ties shall adequately support the reinforcing and shall be placed in general conformance with CRSI Manual of Standard Practice for Reinforced Concrete Construction.

.2.7 Mesh reinforcement shall have wire spacing and gage as noted on the plans and shall conform to ASTM 185.

.2.8 Curing compound shall be non-staining type conforming to ASTM 309, applied in accordance with the manufacturers instructions. Curing compound will be delivered to job site in original containers with all application and technical information shown on the containers or in accompanying literature. Contractor shall obtain approval of all curing compound in writing by the engineer before use.

.2.9 Water stops shall be of the type and size indicated on the plans. Where no size or type is given, PVC or 1/8 inch steel shall be used with a nominal height of 6".

.2.10 Expansion, contraction, construction, and other joints shall be located as shown on the plans or as approved by the engineer. Materials and placement shall conform to ASTM D1751.

330523.3 CONSTRUCTION

.3.1 Forms shall be constructed straight and true to the lines and grades shown on the plans. The Engineer shall approve all formwork before any concrete is placed. approval will be for final configuration only, responsibility for structural integrity of the formwork shall remain with the contractor. Forms will be constructed to tolerances given in ACI 347.

.3.2 All forms shall be adequately oiled with a non-staining form oil prior to concrete placement. All corners and edges shall have a 3/4-inch, 45-degree chamfer. where soil conditions allow, undisturbed earth may be used for forming footing sides.

.3.3 Form removal shall not commence until the contractor has determined that adequate strength has been developed to insure safety and prevent damage to the concrete. in general, stripping times shall be as follows:

Vertical form surfaces on walls
and columns -- 2 days (minimum)

Horizontal form surfaces on beams
and girders -- 6 days (minimum),
with structural support remaining
for 28 days

Supported slab surfaces -- Same as horizontal surfaces above

.3.4 Reinforcement shall be placed as shown on the approved shop drawings and construction plans. Placement tolerance shall be per ACI 318, with spacing or depth + or - 1/4 inch, and longitudinal location + or - 2 inch.

.3.5 Reinforcement shall be protected during storage and in forms to prevent rust. No reinforcing will be allowed when, in the judgment of the engineer, excessive rust, mill scale, or dirt exists of the reinforcing bars.

.3.6 Concrete shall not be placed until approval to do so is given by the engineer. Placement shall be as per astm 614. Concrete shall be mixed and transported in accordance with astm c-94. Concrete shall be placed in final position within 75 minutes after water or cement is first added to the mix. This time may be extended to a maximum of 2 hours where concrete with an approved water reducing retarder is used.

.3.7 The contractor shall use conveyors, chutes, tremies, buckets, etc. For the efficient placement of the concrete but in no case will a placement system be allowed that causes undue segregation of aggregate. All concrete shall be consolidated by vibrating or rodding. The contractor will be responsible for having adequate back up vibrators, screeds, etc. To prevent interruption during a pour.

.3.8 No concrete will be placed during periods of rain, sleet, or other precipitation.

.3.9 No concrete shall be placed when the atmospheric temperature is below 35 degrees fahrenheit or when the temperature threatens to drop below 25 degrees fahrenheit within 48 hours, except upon written permission of the engineer, and such permission will not be granted until satisfactory provisions have been made to protect the work. Should the temperature drop below 30 degrees fahrenheit while concrete is being placed or before it has hardened sufficiently to prevent injury from cold, the contractor shall provide sufficient housing and heating apparatus to enclose and protect the structure is such a way that the air surrounding the fresh concrete can be kept at a temperature above 50 degrees fahrenheit for a period of 3 days after the concrete is placed.

.3.10 During hot weather adequate means shall be taken to protect fresh concrete from heating to temperatures exceeding 90 degrees fahrenheit.

.3.11 All freshly poured concrete surfaces shall be kept moist for minimum of four days to allow for thorough curing. An acceptable curing compound may be used in lieu of wet curing with the engineer's approval. Any concrete to accept paint or coatings shall not be cured with curing compound.

.3.12 An ordinary surface finish shall be given to all concrete. As soon as the concrete has set the required time, the forms shall be removed carefully, the fins removed, and all depressions resulting from the removal of metal ties, and all other holes and rough places carefully pointed with a mortar of sand and cement. The surface of all such pointed surfaces shall be made flush with the adjacent surface by means of a wooden float before setting occurs.

.3.13 A rubbed finish shall be given all surfaces except those designated to receive an ordinary surface finish only. As soon as the ordinary surface finish has set sufficiently to permit, the entire surface shall be thoroughly wet with a brush and rubbed with a no. 16 carborundum stone or an abrasive of equal quality, bringing the surface to a paste. The rubbing shall be continued sufficiently to remove all form marks and projections, producing a smooth, dense surface without pits or irregularities. The material, which, in the above process, is ground to a paste, shall be carefully spread or brushed uniformly over the entire surface and allowed to take a reset. The above-described procedure is called the "first rub."

immediately after the first rub is completed, the surface shall be covered and kept covered for at least 2 days, or until the curing is complete.

The "second rub" to produce the final finish shall be thoroughly wet with a brush and rubbed with a no. 30 carborundum stone or an abrasive of equal quality. This rubbing shall continue until the entire surface is of a smooth texture and uniform in color. The surface shall then be striped evenly with a brush so as to remove excess paste, and the surface left smooth and with only enough paste to obtain the desired color.

Any part of the structure, which is disfigured by the drip from the rubbing, shall be thoroughly cleaned.

.3.14 If approved by the engineer, a brushed-on surface finish may be applied to all concrete surfaces required to receive the "rubbed" finish, using one brushed-on coat where a one-rub finish is specified, and two brushed-on coats where a two-rub finish is specified. The brushed-on surface finish shall be in lieu of the specified rubbed finish. The same type finish, either the brushed-on or the rubbed finish, shall be used throughout the structure.

The material used for the brushed-on finish shall be predominately of portland cement, with special additives, and shall meet the requirements of federal specification TT-P-0035. The material shall be especially manufactured for the purpose of waterproofing exterior concrete surfaces, and also for the purpose of enhancing the appearance of the concrete surface. The final color of the applied finish shall be pearl gray, or near that of good quality cured natural concrete. The proposed material for the brushed-on finish must meet the approval of the engineer prior to its application.

All surfaces to receive the brushed-on surface finish shall first be given the ordinary surface finish as required in subsection 33 05 23.3.12. The brushed-on finish shall not be used to cover up defects in the concrete surface. All necessary repair work must be done prior to the application of the surface finish. Membrane curing compound shall not be used on surfaces to be finished. The brushed-on finish shall be applied strictly in accordance with the written recommendations of the product manufacturer. Workmen who have been instructed in the preparation and application of the material shall do the actual application of the material. The final brushing of the material shall be done in such manner as to present a uniform and attractive appearance, with the final brushing generally being done in one direction.

330523.4 TESTING

.4.1. Mix design information shall be submitted to the engineer for approval. No concrete will be poured without an approved design mix developed in accordance with ACI 318.

.4.2 Field-testing of concrete will be done by a laboratory approved by the engineer. The contractor will be responsible for sampling, making, and curing test cylinders for each pour. He will also be responsible for timely delivery of cured cylinders to the approved laboratory.

Each strength test shall consist of 4 cylinders; two tested at age 7 days and two at 28 days. Before any concrete is placed on the job, a strength test shall be made using the proposed design mix as directed by the engineer and make additional tests until it is established that design mix will produce required strength. For each class of concrete, make one strength test for each pour of 100 cubic yards, but not less than one test for each day's concreting. Specimens shall be secured in accordance with ASTM C-172, made and cured in accordance with ASTM C-31, and tested in accordance with ASTM C-39.

During concreting, additional cylinders may be required for field curing in order to justify removal of formwork. One slump test shall be made for each strength test in accordance with ASTM C-143.

End of section

SECTION 311000
GENERAL SITE WORK

311000.1 General

1.1 Site work shall be confined to the construction area as shown on the plans and shall be done in an approved manner with proper equipment. Excavation, filling, and grading work shall be suspended during rain and inclement weather or when unsatisfactory field conditions are encountered unless otherwise directed by the Engineer. At all times during construction, Contractor shall maintain proper drainage in the construction area.

311000.2 Clearing and Grubbing

2.1 Where trees or brush exist at the site of the work, the construction area shall be cleared and stumps grubbed. Only those trees that seriously interfere with construction shall be cut and care shall be exercised to protect remaining trees and adjacent property. Brush shall be removed from the entire construction area and all stumps, logs, and brush resulting from this operation shall be completely burned or otherwise disposed of to the Engineer's satisfaction. Minor structures that may be on the site shall be removed and disposed of to the satisfaction of the Engineer.

(1) The operations of the Contractor shall be conducted with full consideration to all the proper and legal rights of the Owner and of adjacent property owners and the public and with the least possible amount of inconvenience to them.

(2) The Contractor shall consult with the Owner and Engineer prior to beginning clearing and a full understanding is to be reached as to procedure. The Contractor shall then conduct clearing and grubbing operations in strict accordance with these agreements.

2.2 Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees, which receive damage to branches, shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a "tree dressing."

311000.3 Excavations and Grading

3.1 Dewatering equipment, when necessary, shall be installed prior to beginning excavation. The Contractor shall install a dewatering system capable of maintaining the ground water level of the entire area of construction two (2) feet below the deepest level of the proposed excavation. The dewatering system shall be maintained continuously 24 hours per day, seven

days a week, for the entire period of construction and until backfilling is complete. Upon completion of backfilling, the ground water shall be allowed to slowly adjust to the normal level.

Should the dewatering system fail to maintain the water level as specified above, the Contractor shall employ a soil and foundation testing company selected by the Engineer to make the necessary investigation to determine the effect of the water or the safe bearing value of the soil and, if damaged, to recommend the necessary construction to restore the safe soil bearing value. The cost of employing the testing company and performing the construction recommended by them shall be borne by the Contractor.

The Contractor shall submit to the Engineer for approval, the method of dewatering along with a list of equipment and experience of the personnel performing this work.

SECTION 312500
EROSION CONTROL

312500.1 General

.1.1 Erosion control shall be performed as given on the Erosion Control Plan. Indicated features are to be provided in accordance with standards given below. Special features or construction will be detailed on the Plan Sheet. The Engineer before project construction shall approve all deviations from the Erosion Control Plan.

312500.2 Temporary Construction Entrance

.2.1 Definition - A stone stabilized pad located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area.

.2.2 Design Criteria - Coarse aggregate up to approximately 3 inches in diameter should be used. Pad thickness shall be 6-inches minimum with a pad width of not less than full width at all points of vehicular ingress or egress. Pad length shall be not less than 50 feet. Wheels must be cleaned to remove mud prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with crushed stone, which drains into an approved sediment trap or sediment basin. Entrance shall be located or protected so as to prevent sediment from leaving the site.

.2.3 Maintenance - The entrance shall be maintained in a condition that will prevent tracking or flow of mud onto public rights-of-way. This may require periodic top dressing with 2-inch stone, as conditions demand, and repair and/or clean out of any structures used to trap sediment. All materials spilled, dropped, washed, or tracked from vehicle onto site, onto roadway, or into storm drain should be removed immediately.

312500.3 Temporary Perimeter Dike

.3.1 Definition - A ridge of compacted soil, with a life expectancy usually of one year or less, constructed along the perimeter of the disturbed area.

.3.2 Standards - Drainage areas of not more than 5 acres. Top width of 2-foot minimum with a height (compacted fill): 18-inch minimum unless otherwise noted on the plans. (Height measured from the natural ground at the upslope toe to top of the dike.) Side slopes 2:1 or flatter. The grade is dependent upon topography, but must have positive drainage to the outlet. Where slope of channel behind dike is less than 2%, stabilization may not be required; where 2% or more, stabilization will be required.

.3.3 Outlet - Diverted runoff must be discharged directly into a sediment trapping facility such as a sediment basin, sediment trap, or gravel outlet structure.

.3.4 Construction Specifications - (a) All dikes must be machine compacted. (b) All perimeter dikes must have positive grade draining to a sediment trapping facility. (c) Frequent inspection and required maintenance must be provided. (d) Dikes must be located far enough away from the disturbed area to permit machine regrading and clean-out. (e) Diversion dikes must be seeded and/or mulched immediately following construction.

312500.4 Temporary Diversion Dike

.4.1 Definition - A ridge of compacted soil with a general life expectancy of one year or less, constructed immediately above cut, or fill slopes, or other site feature needing protection from runoff water.

.4.2 Criteria - A drainage area of no more than 5 acres. A top width of 2-feet minimum with a height (compacted fill): 18-inch minimum (height measured from the natural ground at the up-slope toe to the top of the dike.) The side slopes shall be 2:1 or flatter with a grade dependent upon topography, but must have positive drainage to the outlet. Where slope of channel behind dike is less than 2%, stabilization may not be required; where the slope is 2% or greater, stabilization shall be required.

.4.3 Outlet - Diverted runoff must outlet directly onto an on-site, undisturbed, stabilized area, a level spreader, or into a grade stabilization structure or sediment basin.

.4.4 Construction Specifications - (a) All dikes must be machine compacted. (b) All diversion dikes must have positive grade to an outlet. (c) Diverted runoff must outlet directly onto an on-site, undisturbed stabilized area, a level spreader, into a grade stabilization structure, or a sediment basin. (d) Frequent inspection and required maintenance must be provided. (e) Dikes must be located far enough away from the construction area to permit machine regrading and clean-out. (f) Diversion dikes must be seeded and/or mulched immediately after construction.

312500.5 Temporary Interceptor Dike

.5.1 Definition - A ridge of compacted soil or gravel, constructed across a disturbed right-of-way and similar sloping areas, usually to remain for a period of less than one year.

.5.2 Criteria - A top width of 2-feet minimum with a height of 18-inches minimum unless otherwise noted on the plans (height measured from the upslope toe to top of the dike.) Side slopes of 2:1 or flatter (flat enough to allow construction traffic to cross if desired) and with a grade of 0.5% to 1.5%. Spacing distance between dikes: maximum slope of right-of-way above dike: 60 feet, 10%; 100 feet, 5-10%; 150 feet, 5%.

.5.3 Outlet - Interceptor dikes must have an outlet that functions with a minimum of erosion. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

.5.4 Construction Specifications - (a) All earthen dikes must be machine compacted. (b) All interceptor dikes must have positive grade to an outlet. (c) Top width may be wider and side slopes may be flatter if desired. (d) Field location should be adjusted as needed to utilize a stabilized safe outlet. (e) Diverted runoff must outlet directly onto an undisturbed stabilized area, a level spreader, or into a grade stabilization structure. (f) Frequent inspection and required maintenance must be provided.

312500.6 Temporary Level Spreader

.6.1 Definition - An outlet constructed at zero grade across the slope whereby concentrated runoff may be discharged at non-erosive velocities onto undisturbed areas stabilized by existing vegetation.

.6.2 Design Criteria - A specific design for level spreaders will not be required; however, spreader length will be determined by estimating Q10 flow and selecting the appropriate length from the table below.

.6.4 Outlet - Final discharge will be over the level lip onto an undisturbed stabilized area.

.6.5 Construction Specifications - (a) Construct level lip on zero percent grade to insure uniform spreading of storm runoff (converting channel flow to sheet flow). (b) Level spreaders must be constructed on undisturbed soil -- NOT ON FILL. (c) Entrance to spreader must be graded in a manner to insure that runoff enters directly into the zero percent graded channel. (d) Storm runoff converted to sheet flow must outlet onto undisturbed stabilized areas. (e) Periodic inspection and maintenance must be provided to insure intended purpose is accomplished. (f) Frequent clean-out of the level spreader, being careful not to disturb the vegetation below the level lip, may be necessary to prevent blockage by silt.

PLAN VIEW

Designed Q (CFS)	Minimum Length ("L" in Ft.)
Up to 10	15
10 to 20	20
20 to 30	26
30 to 40	36
40 to 50	44

312500.7 Temporary Gravel Outlet Structure

.7.1 Definition - An auxiliary structure installed in conjunction with, and as a part of a diversion, interceptor, or perimeter dike, or other structure designed to temporarily detain sediment-laden surface runoff.

.7.2 Design Criteria - The minimum capacity shall be that required to pass the peak flow expected from a ten-year frequency storm without causing damage to the dike. Minimum length in feet, of the gravel outlet structure, shall be equal to six times the number of acres of contributing drainage area. The invert of the gravel outlet shall not be less than 6 inches lower than the minimum elevation of the top of the dike. Use 1 to 3 inch well-graded gravel.

.7.3 Outlet - Gravel outlet will be discharged onto an already stabilized area or into a stable watercourse.

.7.4 Maintenance - The gravel outlet structure shall be inspected after each runoff-producing rain. The gravel must be replaced when the structure ceases to function as intended due to silt accumulation among the gravel.

.7.5 Construction Specifications - (a) The bases and side slopes of the gravel will be placed so as to conform to the dike configuration. (b) The invert of the gravel outlet shall be not less than 6 inches lower than the top of the adjoining earth dike. (c) The gravel shall extend to the top of the dike.

312500.8 Temporary Pipe Drop

.8.1 Definition - A temporary pipe installed down a bank slop to convey storm runoff from the top to the bottom of the bank slope.

.8.2 Design Criteria - The minimum design capacity for the temporary pipes shall be the peak runoff from a 5-year, 24-hour frequency storm. Additional capacity shall be provided in the form of freeboard, emergency spillway, or other means to prevent overtopping of the dike protecting the pipe during its expected life. Runoff calculations shall be based on an acceptable and currently used method of computing runoff. The minimum pipe diameter shall be 8 inches.

.8.3 Inlet and Outlet - A standard flared end section or equivalent shall be used on the inlet end to decrease head losses and on the outlet end to spread out the concentrated flow.

.8.4 Maintenance - Frequent inspection will be required to avoid clogging of the inlet from debris or vegetation.

.8.5 Vegetative Stabilization - The disturbed area shall be vegetated in accordance with the standard "Planting for Erosion Control."

.8.6 Construction Specifications - (a) The structure shall be placed in undisturbed soil or well-compacted fill. (b) The cut or fill slope shall not be steeper than 1 vertical to 2.0 horizontal (2.0:1) and should not be flatter than 20:1. (c) The pipe shall be imbedded in the embankment to a depth that will insure stability. (d) Protective measures of concrete or rip-rap shall be installed at the outlet as needed to protect against erosion. (e) The pipe shall be of smooth or corrugated metal of the required strength and durability. (f) Backfill shall be placed in layers and tamped to

insure adequate compaction. (g) Fabricated bends in the pipe may be necessary for installation on steep slopes.

312500.9 Temporary Straw (or Hay) Bale Barrier

.9.1 Definition - A barrier installed to intercept and detain sediment.

.9.2 Criteria - Bales must be securely tied and staked in place.

.9.3 Construction Specifications - (a) Bales will be placed in a single row, lengthwise, on the contour, and embedded in the soil to a depth of 3 inches. (b) Bales must be securely anchored in place by stakes or rebars driven through the bales or by other acceptable means to prevent displacement. (c) Inspection must be frequent and repair or replacement must be made promptly as needed.

312500.10 Temporary Sediment Trap

.10.1 Definition - An impounding area formed by excavation or barrier to trap sediment being transported by storm runoff from a disturbed area of very limited size.

.10.2 Design Criteria - The trap shall be sized to provide a minimum storage capacity of 67 cubic yards per acre of contributing drainage area. It should be dimensioned to fit the site conditions and located so as to not interfere with construction operations and to facilitate periodic clean out. Traps shall be not less than 1 foot or more than 2 feet deep measured from the invert of the outlet. The minimum length of flow through the trap shall be 10 feet. Side slopes shall not be steeper than 1:1. Sediment traps must be self-draining unless they are otherwise protected in an approved fashion so as not to present a safety hazard.

.10.3 Construction Specifications - (a) Sediment traps may be constructed on a natural ground surface, on an excavated surface, or on machine compacted fill provided they have a non-erodible outlet. (b) They must be checked after each runoff producing rain and repaired or cleaned as necessary to insure that they will operate as intended.

312500.11 Debris (or Sediment) Basin

.11.1 Definition - A barrier or dam constructed across a waterway or at other suitable location to form a silt or sediment basin.

.11.2 Scope - This section covers the installation of debris basins in sites where: (1) Failure to the structure would not result in loss of life, damage to buildings, highways, railroads, or interruption of use or service of public utilities; (2) Height of embankment does not exceed 20 feet; (3) The drainage area does not exceed 200 acres.

.11.3 Design Criteria - Compliance with Laws and Regulations: Design and construction shall comply with all state and local laws, ordinances, rules and regulations.

.11.4 Sediment Storage Capacity - The sediment storage capacity of a debris basin shall equal or exceed the volume of sediment to be trapped in the basin during its planned, useful life. The minimum capacity provided should be: Developed areas or well-vegetated areas -- .01-acre foot, per acre, per year. In Construction areas or critically eroding areas -- .06-acre foot per year.

If temporary vegetation is to be established immediately after rough grading, the minimum required storage from construction areas might be reduced by 25 percent.

The storage basin shall be cleaned out whenever its functioning is impaired due to insufficient capacity. Debris basins planned to be converted to ponds after the area above is stabilized must be designed for at least a 6-foot depth of water at the dam in addition to the minimum required sediment storage. Also, a drain must be provided whereby the basin can be drained and the collected sediment removed or spread out if necessary to make an acceptable pond.

.11.5 Principal Spillways - A pipe spillway is required on all basins. The pipe spillway shall consist of a vertical pipe riser or box riser joined to a conduit that will extend through the embankment and outlet below the downstream toe of the fill.

The pipe spillway shall be proportioned to convey not less than 0.2 CFS per acre of drainage area without causing flow through the emergency spillway. The minimum size pipe shall be 4 inches in diameter. The vertical pipe riser or box riser shall have a cross-sectional area at least 1.5 times that of the pipe.

One anti-seep collar shall be installed around the pipe when any of the following conditions exist: (1) The settled height of the dam exceeds 15 feet. (2) The conduit is of smooth pipe larger than 8 inches in diameter. (3) The conduit is of corrugated metal pipe larger than 12 inches in diameter.

The anti-seep collars and their connection to the pipe shall be water-tight. Protection against scour at the discharge end of the spillway shall be provided.

Trash racks shall be installed where needed.

.11.6 Earth Emergency Spillways - All debris basins shall have an earth emergency spillway unless the peak flow from the design storm is carried through a pipe spillway or other mechanical spillway. The earth spillway shall be excavated in undisturbed earth or compacted fill. The minimum bottom width shall be 8 feet. The spillway shall be designed to be stable for the design flow.

Peak discharges for design of the emergency spillway shall be computed using an accepted method and shall be based on the soil and anticipated cover conditions in the drainage area during the expected life of the structure.

The crest of the emergency spillway shall be at least 0.5 feet above the crest of the principal spillway.

For debris basins with 20 acres or less watershed, the combined capacities of pipe and emergency spillways shall be sufficient to convey the peak discharge from the 10-year, 24-hour frequency storm. For debris basins with watersheds greater than 20 acres, the combined capacity of pipe and emergency spillway shall be adequate to convey the peak discharge from the 25-year, 24-hour storm.

The top of a dam for all debris basins shall be at least 0.5 feet higher than the stage reached by the design storm.

The crest elevation of the emergency spillway will be determined by the head required on the principal spillway but shall be at least 0.5 feet above the crest of the principal spillway.

.11.7 Embankment (Earth Fill) - The minimum top width shall be 10 feet. Side slopes shall be at least 2-1/2:1.

.11.8 Construction Specifications - Site Preparation-- Areas under the embankment and any structural works shall be cleared and grubbed; all vegetation and objectionable material shall be removed.

.11.9 Clearing - All debris basins designed for permanent water shall be cleared. All sediment basins designed for periodic clean-out will be cleared of stumps.

.11.10 Compaction of Embankment - The material placed in the fill shall be free of all sod, roots, frozen soil, stones over six (6) inches in diameter and other objectionable material. The placing and spreading of fill material shall be started at the lowest point of the foundation and the fill shall be brought up in approximately horizontal layers of such thickness that the required compaction can be obtained with the equipment used. The construction equipment shall be operated over the area of each layer in such a way that will result in the required compaction. Special equipment shall be used when the required compaction cannot be obtained without it.

The distribution and gradation of materials throughout the fill shall be such that there will be no lenses, pockets, streaks, or layers of material differing substantially in texture or gradation from the surrounding material. Where it is necessary to use materials of varying texture and gradation, the more impervious material shall be placed in the upstream and center portions of the fill.

The moisture content of the fill material shall be such that the required degree of compaction can be obtained with the equipment used.

.11.11 Cut-off Trench - A cut-off trench shall be excavated along the dam centerline on earth fill embankments. The minimum depth shall be 2 feet. The cut-off trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be 4 feet but wide enough to permit operation of compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be drained during the backfilling compaction operations.

.11.12 Emergency Spillways - Earth spillways shall be constructed in undisturbed earth unless otherwise specified and approved.

.11.13 Vegetation Protection - The exposed earthen areas resulting from construction or otherwise existing will be stabilized by seeding, sodding, fertilizing and/or mulching as soon after construction as practical and shall conform to the standard "Planting for Erosion Control."

The embankment and spillway shall be fenced where necessary to protect the vegetation.

.11.14 Final Disposal - After temporary structures have served their intended purpose and the drainage area above is properly stabilized, the embankment and resulting silt deposits are to be otherwise disposed of in accordance with an agreed to plan. Denuded areas will be re-vegetated.

312500.12 Land Grading

.12.1 Definition - Reshaping the ground surface to planned grades as determined by engineering survey and layout.

.12.2 Design Criteria - The grading plan and installation shall be based upon adequate surveys and investigations. The plan must show the location, slopes, cuts, fills, and finished elevations of the surface to be graded. The plan shall include all practices necessary for controlling erosion on the site and decreasing siltation downstream. Such practices may include, but are not limited to debris basins, diversion, mulching, temporary or permanent vegetation, retention walls, lined ditches, vegetated waterways, grade stabilization structures, and surface and subsurface drains. The practices may be temporary or permanent depending upon their need after construction is completed. The grading plan shall include the following as a minimum:

(1) The finished cut and fill slopes that are to be vegetated with grasses and legumes shall not be steeper than 2 horizontal to 1 vertical. Slopes to be maintained by tractor or other equipment should not be steeper than 3 horizontal to 1 vertical. The finished grade of cut and fill slopes that are to be vegetated with vines shall not be steeper than 1 horizontal to 1 vertical.

(2) Cut or fills shall not be so close to property lines as to endanger adjoining property without adequately protecting such properties against erosion, sedimentation, slippage, settlement, subsidence, or other related damages.

(3) Structural and/or vegetative practices shall safely conduct surface water to storm drains or adequate watercourses.

(4) Subsurface drainage shall be provided in areas having a high water table to intercept seepage that would affect slope stability, bearing strength, or create undesirable wetness.

(5) No fill is to be placed where it will slide or wash up on the premises of others.

(6) Fill will not be placed adjacent to a channel bank where it will create bank failure and reduce the capacity of the stream, or result in deposition of sediment downstream.

(7) All borrow and disposal areas shall be included as part of the grading plan.

(8) Adequate channels and floodways shall be provided to safely convey the increased runoff from the developed area to an adequate outlet without causing significant channel aggradation, degradation, or increased off site flooding or erosion.

312500.13 Diversion

.13.1 Definition - An earthen channel, with a supporting ridge on the lower side, constructed across the slope.

.13.2 Classification of Diversions

Temporary - Temporary diversions are usually installed to protect some phase of construction or the establishment of vegetation. They normally can be removed after the construction they are protecting is complete or after vegetation on the protected area is established (usually two years or less).

Permanent - Permanent diversions are installed as an integral part of an overall water disposal system. They are designed and maintained as an important part of the system.

.13.3 Design Criteria (Location) - The general location of the diversion will be determined by its purpose. Outlet conditions, topography, land use, soil type, and length of slopes must be considered in arriving at the final location.

On construction sites, the diversions should be located to avoid interference with construction equipment, permanent fixtures, and features of the development.

.13.4 Capacity - Peak runoff values used to determine the capacity requirements of diversion shall be computed using and accepted method. The minimum storm frequency values to be used for design of diversions are outlined in the following table:

MINIMUM DESIGN FREQUENCIES FOR DIVERSIONS

Diversion Type	**Typical Area of Protection**	**Design Storm* Minimum Frequency 24-Hour Duration**
Temporary	Construction areas and areas to be vegetated	2 Years
Permanent	Agricultural land and pollution abatement systems	10 Years
	Low value buildings for storage, livestock, etc. and recreation areas	10 Years
	Homes, schools, industrial buildings and other high value buildings	50 Years

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*In all cases, the design storm frequency shall be selected to provide protection consistent with hazard or damage that would occur if the diversion should overtop.

Where it is not possible to provide adequate sediment control measures for a temporary diversion, the channel capacity must be increased to provide for the expected sediment accumulation.

.13.5 Velocity - Permissible design velocities depend primarily on soil and vegetation. Consideration must be given to the type and growth characteristics of the planned vegetation. This will determine the degree of retardance to be used in designing for capacity. Stability of the

diversion must be determined for the vegetation during its establishment period when its retardance to flow is least effective. Permissible design velocities shall be determined from the table on the following page.

.13.6 Cross-Section - (Permanent Diversion): The channel shall be designed to have stable side slopes. The side slopes for permanent diversion channels should not be steeper than 3:1. The back slopes of the embankment shall not be steeper than 2:1. The constructed ridge height shall include at least 0.3 feet freeboard and a reasonable settlement factor must be provided. The minimum top width of the diversion ridge after settlement shall not be less than four (4) feet. All disturbed and denuded areas will be vegetated, sodded, mulched, or otherwise protected.

.13.7 Cross-Section - (Temporary Diversion): In determining the cross section of temporary diversions, consideration shall be given to soil type, outlet conditions, and machinery working over and around the area. Settlement and top width should be the same as permanent diversions.

.13.8 Protection Against Erosion and Sedimentation and Vegetative Establishment

Temporary Diversion - When the expected use exceeds three (3) months, temporary vegetation shall be established and maintained until the life of the diversion is terminated. Where temporary vegetation is not practical, mechanical protection such as stone centers or mulching shall be provided.

Permanent Diversions - A filter strip of permanent vegetation thirty feet wide, measured from uphill wetted perimeter of the diversion, will be used.

Permanent vegetation will be established and maintained on the ridge and channel of the diversion, and shall conform to the standard for "Planting for Erosion Control."

Eroding and sediment producing areas in the drainage area above the proposed diversion should be stabilized prior to, or concurrent with the construction of the diversion.

.13.9 Outlets - Diversions will be designed to have adequate outlets that will convey runoff without causing erosion of the diversion or to adjacent areas.

The designed elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow.

.13.10 Construction Specifications:

(a) All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the diversion.

(b) The diversion shall be excavated or shaped to line, grade, and cross section as required to meet the criteria specified here, free of irregularities that will impede normal flow.

(c) Fills shall be compacted as needed to prevent unequal settlement that would cause damage in the complete diversion.

(d) All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the diversion.

312500.14 Grassed Waterway or Outlet

.14.1 Definition - A natural or constructed open channel established to safely convey surface runoff.

.14.2 Design Criteria (Capacity) - The minimum capacity shall be that required to convey the peak runoff from a 10-year, 24-hour frequency storm. Any acceptable method may be used to compute the peak runoff.

Consideration must be given to the type and growth characteristics of the planned vegetation. Adequate capacity must be provided in the waterway to convey the peak flow during the most dense growth of the planned vegetation.

.14.3 Velocity - Design velocities should be based upon the erodibility of the soil, duration of flow, and types and quality of vegetation. The table on the following page provides the maximum permissible velocities for different soils and vegetation. However, design velocities should NOT exceed 4.0 feet per second unless the vegetation is already established or will be established by sodding.

.14.4 Outlets - Outlets of grassed waterways must have adequate capacity to convey the designed quantity of water from the waterway without causing damage to downstream areas. The following types of outlets are acceptable:

(1) Natural or constructed vegetated outlets capable of withstanding the design discharge.
(2) Paved or concrete lined channels.
(3) Streams, provided outfall structures are installed where needed to prevent erosion.

.14.5 Depth - The minimum depth of a waterway or outlet receiving water from diversions or other tributary channels shall be that depth required to keep the design water surface elevation in the waterway or outlet at or below the design water surface elevation in the diversion or other tributary channels at their junction when both are flowing at design capacity.

.14.6 Drainage - Drain pipes or other suitable drainage measures shall be provided for in the design for sites having low flow, high water table, or seepage problems except where water tolerant vegetation can be used.

.14.7 Vegetative Stabilization - Permanent vegetation of constructed waterways will be established in accordance with the applicable standard "Planting for Erosion Control" or "Sodding".

.14.8 Construction Specifications -

(a) All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the waterway.

(b) The diversion shall be excavated or shaped to line, grade, and cross section as required to meet the criteria specified here, free of irregularities that will impede normal flow.

(c) Fills shall be compacted as needed to prevent unequal settlement that would cause damage in the complete waterway.

(d) All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the waterway.

312500.15 Lined Waterway or Outlet

.15.1 Definition - A waterway or outlet with an erosion resistant lining of concrete, stone, or other permanent material. The line section extends up the side slopes to designed depth. The earth above the permanent lining may be vegetated or otherwise protected.

.15.2 Scope - This standard applies to waterways or outlets with linings of non-reinforced, cast in place concrete; flagstone mortared in place; rock riprap or similar permanent linings. It does not apply to irrigation ditch and canal lining, grassed waterways with stone centers, or small, lined sections to carry prolonged low flows. The maximum capacity of the waterway flowing at designed depth shall not exceed 100 cfs.

.15.3 Design Criteria (Capacity) - The minimum capacity shall be adequate to carry the peak rate of runoff from a 10-year frequency storm. Capacity shall be computed using Manning's formula with a coefficient of roughness "n" as follows:

Concrete:

Trowel finish	- .012-. 014
Float finish	- .013-. 017
Gunite	- .016-. 022
Flagstone	- .020-.025
Riprap	- .04d50 1/6 where "d" is in feet

For design of riprap, see National Cooperative Highway Research Program Report 108. "Tentative Design Procedure for Riprap - Lined Channels", or other accepted procedures.

.15.4 Velocity - Maximum design velocity shall be as shown below. Except for shot transition sections, flow in the range of 0.7 to 1.3 of the critical slope must be avoided unless the channel is straight. Velocities exceeding critical will be restricted to straight reaches.

Design Flow Depth	Maximum Velocity
0 - .5'	25 fps
.5 - 1.0'	15 fps
l.0'	10 fps

Waterways or outlets with velocities exceeding critical shall discharge into an energy dissipater to reduce velocity to less than critical.

.15.5 Cross-Section - the cross-section shall be triangular, parabolic, or trapezoidal. Monolithic concrete may be rectangular.

.15.6 Freeboard - The minimum freeboard for lined waterways or outlets shall be 0.25' above design high water in areas where erosion resistant vegetation cannot be grown adjacent to the paved side slopes. No freeboard is required where good vegetation can be grown and is maintained.

.15.7 Side Slope - Steeped permissible side slopes, horizontal to vertical will be as follows:

Non-reinforced concrete
Hand-placed, formed concrete:
Height of lining 1.5 ft. or less - vertical
Hand-placed, screeded concrete or mortared
in-place flagstone:
Height of lining less than 2 ft. - 1 to 1
Height of lining more than 2 ft. - 2 to 1
Slip form concrete
Height of lining less than 3 ft. - 1 to 1
Rock Riprap - 2 to 1

.15.8 Lining Thickness - Minimum-lining thickness shall be as follows:

Concrete - 4 inches
Rock riprap - maximum stone size plus thickness of
filter or bedding
Flagstone - 4 inches, including mortar bed

.15.9 Related Structures - Side inlets, drop structures, and energy dissipaters shall meet the hydraulic and structural requirements for the site.

.15.10 Filters or Bedding - Filters or bedding to prevent piping, reduce uplift pressure, and collect water will be used as required and will be designed in accordance with accepted engineering principles. Weep holes and drains will be provided as needed.

.15.11 Concrete - Concrete used for lining shall be so proportioned that it is plastic enough for thorough consolidation and stiff enough to stay in place on side slopes. A dense, durable product will be required. A mix that can be certified as suitable to produce a minimum strength of at least 3,000 pounds per square inch shall be used. Cement used shall be portland cement, Type I or II. Aggregate used shall have a maximum size of 1-1/2 inches.

.15.12 Mortar - Mortar used for mortared in-place flagstone shall consist of a workable mix of cement, sand, and water with a water, cement ratio of not more than 6 gallons of water per bag of cement.

.15.13 Contraction Joints - Contraction Joints in concrete linings, where required, shall be formed transversely to a depth of about one-third the thickness of the lining at a uniform spacing in the range of 10 to 15 feet.

.15.14 Rock Riprap of Flagstone - Stone used for riprap shall be dense and hard enough to withstand exposure to air, water, freezing, and thawing. Flagstone shall be flat for ease of placement and have the strength to resist exposure and breaking.

.15.15 Vegetative Establishment - All disturbed areas shall be vegetated in accordance with the standard "Planting for Erosion Control."

.15.16 Construction Specifications - (a) The foundation shall be cleared of trees, stumps, roots, sod, loose rock, or other material. (b) The cross-section shall be excavated to the neat lines and grades as shown on the plans. Over-excavated areas shall be backfilled with moist soil compacted to the density of the surrounding material. (c) No abrupt deviations from design, grade, or horizontal alignment shall be permitted.
(d) Concrete linings shall be placed to the thickness shown on the plans and finished in a workmanlike manner. Adequate precautions shall be taken to protect freshly placed concrete from extremely not temperature and to insure proper curing. (e) Filter, bedding, and rock riprap shall be placed to line and grade and in the manner specified. (f) Construction operations shall be done in such a manner that erosion, air, and water pollution will be minimized and held within reasonable and legal limits. The complete job shall be workmanlike and present a good appearance.

312500.16 Topsoiling

.16.1 Definition - The addition of topsoil to a site to be planted to grasses, legumes, shrubs, or trees.

.16.2 Specifications

Topsoil Quality - (a) Topsoil may be any texture except sand, sandy clay, clay loam, silty clay, or clay. (b) The material shall be friable and free of tree roots, noxious weeds, and stones more than 1-1/2 inches in diameter or length, and of other debris. (c) Soil treated with an herbicide will not be used for topsoiling if it is determined that the herbicide will be damaging to desirable vegetation.

Sources of Topsoil - (a) Material for topsoiling shall be taken from the natural surface layers (a horizon) of soils known to be capable of producing good yields of cultivated crops or hay. (b) Topsoil may be stripped from and stockpiled at a site for later replacement. Stockpiled topsoil will not be compacted. (c) Areas from which topsoil has been removed shall be protected against erosion.

Applying Topsoil - (a) Topsoil will not be collected or spread while it is wet. (b) Subsurface will be scarified or otherwise tilled to facilitate bonding prior to spreading topsoil. (c)

Topsoil will be uniformly spread to a minimum settled depth of three inches and will be spread to conform with designed finish grades.

Cubic Yards of Topsoil Required to Cover

Depth (inches)	1,000 Square Feet	One Acre
1	3	134
2	6	269
3	9	403
4	12	538
5	15	672
6	18	806

1 Cubic Yard - 27 Cubic Feet - 46,656 Cubic Inches
1,000 Square Feet, 1 Inch Deep - 144,000 Cubic Inches - 3.08 Cubic Yards
1 Acre (43,560 Square Feet), 1 Inch Deep - 6,272,000 Cubic Inches = 134.43 Cubic Yards

312500.17 Planting for Erosion Control

.17.1 Definition - Planting vegetation, either permanent or temporary, on areas subject to erosion.

.17.2 Specifications - (Site Preparation): (a) Grading, shaping and other earth moving will be completed to the extent necessary to permit seedings or plantings, either temporary or permanent. The finished grade of slopes with a slope length of more than four (4) feet that are to be planted and maintained in grasses and/or legumes shall be no steeper than 2:1. (Slope lengths steeper than 2:1 and less than four (4) feet long may be seeded.) Similar slopes to be maintained in vines shall be no steeper than 1:1. (b) Concentration of water that will cause excessive erosion while vegetation is being established will be diverted to a safe outlet. Structures used to divert water or provide additional protection to an area may be either permanent or temporary according to the needs of the site; however such structures must conform to the appropriate standards and specifications. (c) Stones, stumps, and trash that will interfere with seedbed preparation, plantings, or the planned use and maintenance of the area will be removed.

.17.3 Providing for Short-Term Cover (Mulching) - Mulch alone may be used to provide short-term protection against erosion. Mulches will be applied and anchored in accord with the provisions of the standard and specification for "Mulching".

Planting for Short Term Cover (Seedbed Preparation) - (a) Tillage shall be the minimum needed to break compaction, incorporate fertilizers when incorporation of them is required, and provide enough loose soil to cover the seed when the seed is to be drilled or covered by harrowing. Tillage may be incidental to grading or shaping and may be excluded on newly

graded areas that will be seeded before a crust can form. (b) Tillage maybe by any suitable implement. (c) Tillage will be on the contour or across the slope where it is feasible.

Plant Selection - (a) Refer to Table 1 for species, planting rates, and planting dates. (b) Select the species that are best adapted to the site and to the needs and desires of the land user.

Seeding - (a) Seed may be placed by the most convenient available method. Regardless of the method used, the seed must be distributed uniformly.

Lime and Fertilizers - (a) Lime will not be required for short-term seedings unless a soil test shows the pH to be below 4.5 or unless it is desirable to apply lime for the benefit of a long-term planting which will follow the short-term seeding. When lime is applied, it will be uniformly spread and incorporated into the soil. (b) A minimum of 500 pounds per acre (11.5 pounds per 1,000 square feet) of 10-10-10 fertilizer, or the equivalent, will be uniformly applied at planting time unless a soil test indicates the need for a different rate or analysis of fertilizer. Additional nitrogen applied later as a top-dressing, may be required for some seeding.

.17.4 Planting for Long-Term Cover - (Preparing the Soil for planting) -(a) Preparation shall consist of the least tillage necessary to break compaction, incorporate lime and fertilizers where incorporation of them is required, and allow the proper placement of seed, sprigs, or plants. Preparation may be incidental to grading and shaping and may be eliminated when: (1) Earthwork has been recently completed and the area will be seeded to grasses or legumes before a crust can form. (2) Grasses or legumes are to be planted directly into the stubble of a temporary cover crop or on top of a mulch. (b) Tillage may be by any suitable implement. (c) Tillage will be on the contour or across the slope where it is feasible. (d) Site preparation by furrowing, discing, scalping, or bedding will be required where trees or shrubs are to be planted in a heavy vegetative cover. Grass and legumes will be planted between rows of trees or shrubs on bare or sparsely vegetated areas.

Plant Selection - (a) Refer to Tables 2 and 3 for plants, planting rates, and planting dates. (b) Plants shall be selected on the basis of species characteristics, site and soil conditions, the planned use and maintenance of the area, the time of year the planting is to be made, and the needs and desires of the land user. (c) Seeding mixtures intended to provide long-term, low maintenance cover for critical areas will ordinarily include a perennial legume and one or more perennial grasses. For sod specifications, refer to the standard and specifications for "Sodding". (d) Seeding mixtures may include nurse crops of a small grain or a grass for quick cover (such as rye or brown top millet); however, the rate of the nurse crop in a mixture shall be no greater than 25% of the rate usually used when it is seeded alone. (e) The planting rates listed in Table 2 may be adjusted to meet special conditions and to accord with local experience; however, the approximate ratios of species in mixtures indicated in Table 2 will be maintained.

Seeding and Planting - (a) Grasses and legumes shall be planted uniformly. Drilling, broadcasting, or hydroseeding methods may be used. Seed planted by broadcasting shall be lightly covered by rolling or harrowing in all areas accessible to implements. Seeds of legumes intended to provide long-term cover inoculated with an inoculant appropriate for the species

immediately prior to planting. (b) Trees, shrubs, and vines may be planted with appropriate planters, seeders, or hand tools. Each plant will be set in a manner that will avoid crowding the roots, and soil shall be firmed about the roots. Seedlings shall be planted at a depth nearly equal to or slightly deeper than the depth at which they were originally growing.

Lime and Fertilizer - (a) Unless a soil test indicates different requirements, lime and fertilizers will be applied at rates that equal or exceed those shown below when planting grasses and legumes. (1) Agricultural limestone: 1-1/2 tons per acre (70 pounds per 1,000 square feet), or the equivalent. (2) Fertilizers as one of the following: 1,000 pounds per acre (23 pounds per 1,000 square feet) of 10-10-10 fertilizer, or the equivalent at planting time, or 1,000 pounds of 5-10-10 fertilizer per acre (23 pounds per 1,000 square feet) at planting time plus a top dressing of fertilizer at a later date. The top-dressing shall include a minimum of 50 pounds per acre (1.1 pounds per 1,000 square feet) of available nitrogen where grasses are to be encouraged and a minimum of 40 pounds per acre (0.9 pounds per 1,000 square feet), each, of P_2O_5 and K_2O where legumes are to be encouraged. (b) No lime and/or fertilizer will be applied without a soil test when planting trees or shrubs.

Mulching - (a) Mulch is used to provide necessary additional protection against erosion and/or to aid in the establishment of plant cover. Refer to the standard and specification for materials, rates, and methods of anchoring mulches. (b) Steep slopes will be mulched as soon as possible after planting, but in no case will mulching be delayed more than forty-eight (48) hours after planting. (c) Seedings made so late in the fall or winter that germination cannot be expected until spring (dormant seedings) will be mulched. (d) Appropriate mulch materials may be applied simultaneously with seed and fertilizer when they are applied by a hydroseeder.

.17.5 Hydraulic Seeding Methods (Hydroseeding) - (a) Lime, fertilizers, seeds, and appropriate mulch materials may be applied simultaneously in a mixture of these materials and water by a hydroseeder. The water and materials mixture (slurry) will be uniformly applied at a rate that will not cause erosion. (b) Legumes will be treated with four times the manufacturer's recommended rate of inoculant when they are planted by a hydroseeder.

.17.6 Management of Plantings to Secure Cover - (a) Planted areas shall be protected from damage by fire, grazing, weed competition, and traffic. (b) Additional fertilizer shall be applied as needed, to obtain vigorous growth and desirable density and composition of vegetation.

312500.18 Mulching

.18.1 Definition - Applying plant residues or other suitable materials not produced on the site to the soil surface.

.18.2 Specifications (Site Preparation) - Construction work and/or plantings shall be completed according to appropriate specifications or plans prior to applying a mulch.

.18.3 Mulching Materials - (a) The mulch materials that best meet the needs of the site and the desires of the land users shall be selected from the list which follows. All materials shall be uniformly distributed at the rate indicated.

(1) Small Grain Straw and Hay - Apply 1-1/2 to 2 tons per acre of 70 to 90 pounds per 1,000 square feet. The material must be dry and free of coarse stems, mold damage, and noxious weeds. It will be anchored where there is danger of it being blown or washed away.

(2) Pine Straw - Apply one-half inch deep on area plantings or from four to six inches deep around individual trees, shrubs, or vines. Needles from long-leaved species of pines will be used.

(3) Sericea Seed-Laden Hay - Apply at rates of two to four tons per acre or 90 to 180 pounds per 1,000 square feet as needed to cover the ground 100%. The sericea shall be cut when about 75% of the seeds are brown and shall be taken from fields that reasonably could be expected to produce at least 300 pounds of hulled seed per acre.

(4) Juts Fiber Matting (Soil Antiwash, Erosinet, or the equivalent) - Matting shall be placed in contact with the soil loosely but smoothly. When used in areas of concentrated flows, matting shall be installed in accord with the provisions of Figure 1. Staples used to anchor matting shall be six inches in length, one inch wide at the crown and made from No. 11 (0.120 inch diameter) wire. One-half of the seed to be sown on matted areas shall be sown before the matting is placed. Adjacent strips of matting shall be overlapped approximately two inches and the overlap stapled in the same manner as an edge.

(5) Barnyard Manure - Apply at the rate of eight tons per acre or 70 to 90 pounds per 1,000 square feet. Manure with a high straw content will be used. Barnyard manure will not be used to mulch frozen soil when its odor will be objectionable, or where surface waters will be contaminated.

(6) Wood Cellulose Fiber - Apply at a minimum rate of 1,000 pounds per acre or 25 pounds per 1,000 square feet with a hydro-seeder. The use of this material is limited to flatter slopes and to optimum seeding dates.

(7) Wood Chips - Apply in layers two to six inches deep or 460 to 920 pounds per 1,000 square feet. The application of wood chips is limited to flatter slopes and is prohibited in areas subject to a concentrated flow of water.

(8) Liquid Asphalt (Cutback Asphalt) - Spray 1,250 gallons per acre or 28.7 gallons per 1,000 square feet of the slow curing (SC) type. (Caution: This material sheds water and may inhibit the growth of seeds planted on dry soils).

(9) Burlap, Tobacco Cloth, and other Cloths - Materials will be spread loosely but smoothly over the area to be protected and anchored to prevent washing or blowing away.

(10) Other Materials - Mulch materials other than those listed above, may be used provided they: (a) fulfill the purposes listed in the standard and, (b) are applied according to the manufacturer's specifications or current USDA, or Clemson University publications.

.18.4 Mulch Anchoring Materials and Methods - (a) The material or method best suited to the mulching material used, the site, and the desires of the land user will be selected from the list below.

(1) Punching into the Soil - Ends of fibers will be pushed into the soil approximately three inches by passing over them with a special implement built for the purpose, or a farm disc set straight, or by the use of a shovel in small areas.

(2) Asphalts - (a) Liquid asphalt of the rapid (RC) or medium (MC) curing types will be sprayed on hay or straw mulched areas at the minimum rate of 300 gallons per acre of 6.9 gallons per 1,000 square feet. (b) Asphalt emulsions; types SS-1, MS-2, RS-1, or RS-2 may be either injected into hay or straw mulch as it is blown on or sprayed on top of the mulch after it is spread. When the asphalt emulsion is blown on with the mulch, the rate of application will be a minimum of 250 gallons per acre (3.4 gallons per 1,000 square feet), and when it is sprayed on the mulch the rate will be 300 gallons per acre (6.9 gallons per 1,000 square feet). No asphalt emulsions that have been allowed to freeze will be used, and the material will be kept between 75 and 160 degrees F while it is being applied.

(3) Paper Twine Fabric, Mulch Netting and Other Net Materials These materials shall be installed in accordance with the provisions of Figure 2. Staples used to anchor nettings shall be six inches in length, one inch wide at the top, and made from No. 11 (0.120 inch diameter) wire. Rolls of netting may be installed with the length either up and down the slop or across it.

(4) Pegs and Twine - This method will be used on hay or straw and other long-fiber mulches only. Pegs 8" to 20" long will be set on intervals of approximately 3 feet by 3 feet and driven within 3" of the soil surface. Twine will then be used to form a net between pegs. The twine will be looped around each peg twice and the slack pulled out between pegs. After the net is woven, the pegs will be driven in until their tops are flush with the soil's surface.

(5) Rye or Millet Seed - Rye or millet seed may be added to appropriate seeding mixtures for the purpose of anchoring mulches. Rates will not exceed 20 pounds of brown top millet or 15 pounds of rye per acre.

(6) Other Mulch Anchoring Materials and Methods - Materials and methods for anchoring mulches other than those listed above may be used provided: (a) They adequately protect the mulch against wind or water erosion. (b) They are practical and feasible. (c) They are acceptable to the landowner or user.

312500.19 Sodding

.19.1 Definition - Planting sod of adapted perennial grasses.

.19.2 Specifications - Site Preparation - (a) All grading, shaping, and other earth moving shall conform to appropriate plans or specifications prior to placing sod. (b) All rocks, roots, waste materials, and other trash that will interfere with placing or maintaining sod or the planned use of the area will be removed. (c) Topsoil, when it is used, shall be uniformly spread to a minimum settled depth of three inches.

.19.3 Tillage - (a) Sites to be sodded shall be tilled to the minimum extent necessary to break compaction or surface seals, incorporate lime and fertilizer, and provide enough loose soil for fine finish grading where a lawn-like turf is to be established.
(b) Tillage may be by any suitable implement or combination of implements and will be on the contour or across the slope where it is feasible. (c) Final tillage operations shall leave the soil smooth and firm. Areas to be established in lawn-like turf shall be rolled prior to placing sod.

Any depressions revealed that will cause water to stand shall be filled, and any mound that will cause scalping when the grass is mowed shall be leveled.

.19.4 Sod Quality - (a) Sod intended primarily for erosion control or where aesthetic values are of minor importance may be taken from fields that have dense, vigorous standards of desirable species relatively free of weeds. (b) Sod to be used where aesthetic values are important will be taken from sod nurseries where the turf is known to be true to type and of uniform, high quality. (c) Sod may be cut into uniform blocks or strips of any convenient dimensions to facilitate handling; however, the edges must be cut straight and smooth. The thickness of each piece (combined soil and root depth and exclusive of crowns, stems, and leaves) shall be no more than one (1) inch. (d) Sod that has become heated or dried will not be used. (e) No area stripped of sod will be left without adequate protection against erosion.

.19.5 Lime and Fertilizer - (a) The required amounts of lime and fertilizer will be incorporated into the soil. Incorporation may be incidental to tillage. (b) Unless a soil test indicates different needs, the following minimum amounts of lime and fertilizer will be applied: Lime - One ton per acre or 46 pounds per 1,000 square feet. Fertilizer - One thousand pounds per acre or 23 pounds per 1000 square feet of 10-10-10 fertilizer or the equivalent.

.19.6 Placing Sod - (a) Dry soils will be watered prior to placing sods. (b) Placement will begin at the lower end of slopes and channels with the longest axis of the sod pieces aligned across the slope or channel. Joints between pieces will be staggered between rows, and each piece will be placed as snugly as possible against the adjacent one. Any small gaps or voids remaining after the sod pieces are laid will be filled with topsoil. (c) Outer border pieces or strips of sod placed in channels will be set low enough that water entering the channel from the side will flow over them. (d) Newly placed sod in danger of slipping on steep slopes before the new root system can develop will be anchored with wooden pegs or wire staples. (e) Freshly placed sod in areas planned for high intensity use will be rolled or tamped where it is feasible, then watered until the water penetrates the soil beneath the sod.

.19.7 Time of Sodding - Sodding may be done any time during the growing season, but must be completed at least four weeks before the end of the growing season or before the newly sodded area is used intensively.

312500.20 Open Channel

.20.1 Definition - Constructing or improving a channel, either natural or artificial, in which water flows with a free surface.

.21.2 Design Criteria - Location - The alignment of channels shall not be changed to the extent that the stability of the channel or laterals thereto is endangered.

.21.3 Channel Capacity - The capacity for open channels shall be determined by procedures applicable to the purposes to be served, and in accordance with sound engineering principles.

The water surface profile or hydraulic grade line for design flow shall be kept below bank level for all significant areas. The "n" value for aged channels, assuming the expected maintenance, shall be used in this computation. The required capacity shall be based on peak flows for the design storm consistent with the purpose of the channel, desired level of protection, and economic feasibility.

In urban or urbanizing areas, a channel with its associated floodway should be designed to convey the 100-year storm without permitting floodwater to damage homes, buildings, or other valuable property.

.21.4 Hydraulic Requirements - Manning's formula shall be used to determine the velocities in the channels. The "n" values for use in this formula, when designing channels to be constructed or modified, shall be estimated using sound engineering references.

.21.5 Channel Cross Section - The required channel cross section and grade are determined by the design capacity, the materials in which the channel is to be constructed, and the requirements for maintenance. A minimum depth may be required to provide adequate outlets for subsurface drains, tributary ditches or streams. Developments through which the channel is to be constructed must be considered in design of the channel section. Safety considerations are important in the selection of the cross section in urban areas.

.21.6 Channel Stability - Characteristics of a stable channel are: (a) It neither aggrades or degrades beyond tolerable limits. (b) The channel banks do not erode to the extent that the channel cross-section is changed appreciably. (c) Excessive sediment bars do not develop. (d) Excessive erosion does not occur around culverts and bridges or elsewhere. (e) Gullies do not form or enlarge due to the entry of uncontrolled surface flow to the channel.

All channel construction and modification shall be in accordance with a design that can be expected to result in a stable channel that can be maintained at reasonable cost.

Channel stability shall be determined for an aged condition, and the velocity shall be based on the design flow or the bank full flow, whichever is greater, using an "n" value based on the expected kind and density of vegetation and assuming good maintenance. The discharge used in stability analyses of channels having a controlled inflow shall be their design flow.

Channels also must be stable under conditions existing immediately after construction. For this stability analysis, the velocity shall be calculated for the expected flow from a ten-year frequency storm on the watershed, or the bank full flow, whichever is smaller, and the "n" value for the newly constructed channel shall be used. The "n" values of newly constructed channels in fine-grained soils and sands generally should not exceed 0.025.

.21.7 Travel ways for Maintenance - Travel ways for maintenance shall be provided as a part of all channel modification. A travel way shall be provided on each side of large channels if necessary for use of maintenance equipment. Travel ways must be adequate for movement and operation of equipment required for maintenance of the channel.

21.8 Appurtenant Structures - The design of channels should provide for all structures required for the proper functioning of the channel and the laterals thereto and travel ways for operation and maintenance. Recessed inlets and structures, needed for entry of surface and subsurface flow into channels to prevent significant erosion or degradation, shall be

included in the design of the channel. If the proposed channel bottom elevation is below the elevation of the bottom of a lateral channel at their junction to the extent that a recessed inlet is not feasible, the lateral channel must be stabilized by a sound structure.

The effect of channel modifications on existing culverts, bridges, buried cables, pipelines, and other fixed improvements shall be evaluated to determine the need for modification or replacement.

Culverts and bridges which are modified or added as part of channel improvement projects shall meet reasonable standards for the type of structure and shall have a minimum capacity equal to the design discharge. When the design discharge is based on storms which occur frequently, i.e., storms of one or two-year frequency, it may be desirable to increase the capacity of the culverts and bridges above the design discharge. When a county, city, state, or federal highway is involved, the responsible agency will determine the capacity of the bridge or culvert required.

.21.9 Disposition of Spoil - Spoil material resulting from clearing, grubbing, and channel excavation shall be disposed of in a manner which will: (a) Minimize over bank wash, (b) Provide for the free flow of water between the channel and flood plain unless the valley routing and water surface profile are based on continuous dikes being installed, (c) Not hinder the development of travel ways for maintenance, (d) Leave the right of way in the best condition feasible, consistent with the project purposes, for productive use by the owner, and (e) Improve the aesthetic appearance of the site to the extent feasible.

.21.10 Vegetative Establishment - Vegetation shall be established on all bare areas including the channel banks in accordance with the standard "Planting for Erosion Control".

.21.11 Construction Specifications - Specifications for open channels shall be in keeping with this standard and shall be prepared for each job depending upon its location and intended purpose.

312500.22 Clearing and Snagging

.22.1 Definition - Removing snags, drifts, or other obstructions within a channel.

.22.2 Design Criteria - The channel capacities, both before and after improvement, shall be determined by using the Manning equation, using applicable value of the retrace factor, "n", or both conditions. The value of "n" used to determine channel capacity after improvement shall reflect the degree of maintenance expected in future years.

The area to be cleared and snagged shall include the perimeter of the channel, the flow area of the floodway, or both. Adjacent trees or other objects that may fall into the channel shall also be included. Clearing and snagging may also be specified for other areas, including berms, for use as temporary disposal areas, for travel ways, or for planned conservation uses.

.22.3 Channel Stability - The stability of the channel shall not be impaired due to the clearing and snagging. Instability resulting from this practice shall be corrected.

.22.4 Vegetative Stability - Disposal areas or any denuded areas resulting from the clearing and snagging operations should be vegetated in accordance with the standard "Planting for Erosion Control."

.22.5 Construction Specifications - All trees, stumps, and brush within the perimeter of the channel shall be cut as close to ground level as the cutting tools will permit. Where other areas are to be cleared, the trees, brush, and other woody vegetation shall be cut within the maximum distance above ground level required by the planned use of the areas and/or as specified in the project plan.

Trees shall be felled in such a manner as to avoid damage to other trees, property, and objects located outside the limits of clearing.

Down trees, logs, drifts, boulders, debris, and other obstructions, lying wholly or partially within the channel, shall be removed. Piling, piers, headwalls and sediment bars that obstruct the free flow of water will be removed when so designated in the plans.

The use of explosives in any and all clearing and snagging operations shall strictly comply with applicable state statutes and regulations.

Trees, logs and all combustible material resulting from the clearing and snagging operations shall be burned, buried, piled in a designated disposal area, or otherwise disposed of as specified for the project. The residue from burning and noncombustible material will be buried outside the channel or placed in designated disposal areas. All buried material will be covered with earth to permit the planned land use.

312500.23 Grade Stabilization Structure

.23.1 Definition - A structure to stabilize grade or to control head cutting in natural or artificial channels. (This standard applied to all types of grade control structures. It does not apply to storm sewers or their component parts.)

.23.2 Design Criteria - Compliance with Laws and Regulations - Design and construction shall be in compliance with state and local laws and regulations.

.23.3 General - Designs and specifications shall be prepared for each structure by an engineer or on an individual job basis, depending on its intended purpose, site conditions, and the basic criteria of the conservation practice with which the structure is planned. The following items contain information on some typical structures:

(1) Channel linings of concrete, asphalt, half-round metal pipe, gabions, or other suitable lining materials. These linings should generally be used where channel velocities exceed safe velocities for vegetated channels or where durability of vegetative lining is adversely affected by seasonal changes. Adequate protection will be provided to prevent erosion or scour of both ends of the channel lining.

(2) Outfall structures of concrete, rock riprap, or other suitable material used to lower water from one elevation to another. These structures are applicable where it is desirable to drop the watercourse elevation over a very short horizontal distance. Adequate protection will be provided to prevent erosion or scour upstream, downstream and along sides of outfall structures.

(3) Pipe drops of metal pipe with suitable inlet and outlet structures. The inlet structure may consist of a vertical section of pipe or similar material, a standard flared end section, an embankment or a combination of these. The outlet structure will provide adequate protection against erosion or scour at the pipe outlet.

.23.4 Capacity - Structures that are designed to operate in conjunction with other erosion control practices shall have a minimum capacity sufficient to handle the bank full capacity of the channel or pipe delivering water to the structures.

Peak runoff values, used to determine the capacity requirements of grade control structures, shall be computed using an accepted method.

Structures will involve the retarding of floodwater, or the impoundment of water shall be designed using storm frequency to provide protection consistent with the hazard or damage that would occur if structures should overtop or break.

Island type structures shall be proportioned to discharge a capacity equal to the downstream channel capacity at bank full stage.

.23.5 Design Velocities - Design velocities shall be determined using Manning's formula or other appropriate and accepted procedures. The design velocities computations will be based upon a roughness coefficient "n" commensurate with the type of channel lining used. Design velocities will be in the safe range for the type of channel linings used and will be based on the design peak flow. Values of "n" to be used for different type linings are given below:

Values of "n" to be used with Manning's Formula*

Surface	Best	Good
Cast Iron Pipe	.011	.012
Wrought Iron Pipe (Galvanized)	.013	.014
Riveted and Spiral Steel Pipe	.013	.015

Values of "n" to be used with Manning's Formula*

Surface	Best	Good
Vitrified Sewer Pipe	.010	.013
Clay Drain Tile	.011	.012
Brick in Cement Mortar	.012	.013
Concrete Pipe	.012	.013
Concrete Lined Channels	.012	.014
Semi-Circular Metal Flumes, Smooth	.011	.012
Semi-Circular Metal Flumes, Corrugated	.0225	.025

*From King's Handbook of Hydraulics

.23.6 Foundation Investigations - Foundation investigations shall be made at each site. Sufficient soil borings shall be made at the structure site to determine suitability of the site for the proposed structure.

The foundation material shall (1) have required supporting strength, (2) be resistant to sliding and to piping, and (3) possess uniform consolidation characteristics.

.23.7 Vegetative Stabilization - Dikes, embankments, diversions, or other earthwork including borrow areas or other disturbed areas, shall be properly vegetated in accordance with the standard "Planting for Erosion Control" and/or other applicable standards.

.23.8 Construction Specifications - The quality, proportioning, strength, and placement of the specified construction materials shall be in accordance with the engineer's design.

312500.24 Stream bank Protection

.24.1 Definition - Stabilizing and protecting banks of streams or excavated channels against scour and erosion by structural means.

.24.2 Scope - This standard covers structural measures used to stabilize and protect the banks of natural streams and excavated channels. It does not cover the vegetative measures that may be used for streambank protection, either when used alone or to supplement the mechanical measures.

.24.3 Design Criteria - Since each reach of channel is unique, measures for streambank protection must be installed according to a plan and adapted to the specific site. Designs shall be developed in accordance with the following principles:

(1) Protective measures to be applied shall be compatible with improvements planned or being carried out by others.

(2) The grade must be controlled; either by natural or artificial means, before any permanent type of bank protection can be considered feasible unless the protection can be safely and economically constructed to a depth well below the anticipated lowest depth of bottom scour.

(3) Streambank protection shall be started and ended at a stabilized or controlled point on the stream.

(4) Needed channel clearing to remove stumps, fallen trees, debris, and bars which force the stream flow into the streambank shall be an initial element of the work.

(5) Changes in channel alignment shall be made only after an evaluation of the effect of the land use, interdependent water disposal system, hydraulic characteristics, and existing structures.

(6) Structural measures must be effective for the design flow and be able to withstand greater floods without serious damage.

(7) Vegetative protection shall be considered on the upper portions of eroding banks and especially on those areas that are subject to infrequent inundation.

.24.4 Construction Specifications - Measures and construction methods that enhance fish and wildlife values shall be incorporated as needed and practical. Special attention will be given to protecting and maintaining key shade, food, and den trees and to stabilization of disturbed areas. Removal of any trees and brush required will be done in such a manner as to avoid damage to other trees and property.

Disposal of trees, brush, and other material will be done in such a manner as to have the least detrimental effect on the environment.

Construction operations shall be carried out in such a manner that erosion, and air and water pollution will be minimized and held within legal limits.

The completed job shall present a workmanlike finish.

SECTION 313000
EARTHWORK

Section 313000.1 General

This specification is intended to be a part of the contract documents and to be included in the Contract Agreement as executed. It is intended to be a supplement to the approved Geotechnical Report for this project. Where there is a conflict between this specification and the geotechnical report, the geotechnical report will govern.

Section 313000.2 Scope

This specification governs the technical requirements for earthwork and grading including clearing, grubbing, topsoil handling and stockpiling, handling of borrow and waste, temporary erosion and sediment control, and other necessary activities to grade the site to the lines, grades, and sections indicated on the design drawings.

Section 313000.3 Related Work Specified Elsewhere

.3.1 **Section 31 10 00 General Sitework, Section 32 92 00 Temporary Erosion Control, Section 31 25 00 Erosion Control, Section 881 Rip-Rap Blanket**

Section 313000.4 Reference Codes, Specifications, and Standards

.4.1 **Current editions or revisions of the following codes, specifications, and standards shall apply unless modified in this specification or on the design drawings:**

.4.1.1 American Society for Testing and Materials—ASTM
Applicable Standards

ASTM D698 Standard method of test for moisture density relations of soils (Standard Proctor Method).

ASTM D1557 Standard method of test for moisture density relations of soils. (Modified Proctor Method).

ASTM D1556 Standard method of test for density of soil in place by the sand-cone method.

ASTM D2937 Standard method of test for density of soil in place by the drive cylinder method.

ASTM D2922 Standard method of test for density of soil in place by the nuclear method.

ASTM D3017 Standard method of test for moisture of soil in place by the nuclear method.

ASTM D2049 Standard method of test for relative density of cohesionless soils.

ASTM D2167 Standard method of test for density of soil in place by the rubber balloon method.

ASTM D2487 Classification of soils for engineering purposes.

.4.1.2 International Building Code, 2006 Edition.

.4.1.3 All applicable local, county, state, and federal codes and OSHA

Section 313000.5 Clearing and Grubbing

.5.1 This section shall govern clearing and grubbing of land located within the limits shown on the plans, together with areas for borrow pits, disposal areas, and the areas of roads, parking areas, railroads, buildings, and structures.

.5.2 In excavation areas and fill areas, all trees, stumps, roots, stubs and brush more than two inches in diameter shall be cut off, excavated, and removed to a depth of not less than two feet below the ground surface and the entire area grubbed free from heavy vegetation, grass, roots, rubbish and refuse. In areas of clearing and grubbing where no further earthwork will occur, all excavations made for the removal of trees, stumps, etc., shall be filled with suitable material and compacted thoroughly so as to make the surface of these sections conform to the surrounding surface. In fill areas, all soil disturbed as a result of clearing and grubbing operations shall be recompacted in accordance with the geotechnical report for this project.

.5.3 Trees, bushes, shrubs or growth designated by the Owner to remain shall be protected and saved from harm during the progress of the work. No trees, bushes, or shrubs outside the initial construction area shall be damaged in any manner.

.5.4 All materials resulting from clearing and grubbing operations shall be removed from the site and legally disposed of at no additional cost. Upon completion of the operations, nothing shall remain within limits of the site which was deposited as a result of the clearing and grubbing operations.

Section 313000.6 Topsoil

.6.1 Topsoil shall be excavated in cut and fill areas and stored for later use. The topsoil shall be excavated to the depths as directed, not less than four inches, and shall be quantified by the construction manager and transported and deposited by the contractor in offsite stock piles to be obtained and maintained by the contractor. These offsite stock pile areas must be accessible to the owner or owner's representative at all times. Topsoil shall be kept separated from other excavated materials, and shall be piled free of roots and other undesirable material.

.6.2 Following finished grading operations, the graded areas which are not to be further improved or used for material storage, ponds, etc., shall be overlaid with topsoil of a compacted thickness of 4 inches minimum prior to grassing operations.

.6.2.1 The topsoil shall be obtained from stockpiles and placed on the areas at times when the subgrade is not muddy.

.6.2.2 The spreading shall be uniform and once spread,the topsoil shall be compacted.

.6.2.3 Prior to completion, the areas shall be dragged so that the surface is free of roots, sticks, and other vegetation remains.

Section 313000.7 Materials

.7.1 Structural Fill (Borrow) The materials used for structural fill/borrow shall conform to the guidelines outlined in the approved Geotechnical Report for this project. All excavated materials that are to be used as structural fill are to be quantified by the construction manager and transported stockpiled by the contractor off site in locations obtained and maintained by the contractor. These offsite stock pile areas must be accessible to the owner or owner's

representative at all times. The project Geotechnical Engineer shall approve all material to be used for structural fill/ borrow on this project.

.7.2 All other material requirements shall be as directed by the approved Geotechnical Report for this project.

.7.3 Unsuitable Material

Unsuitable material is defined as material encountered in excavations or at the level of subgrade which does not meet the requirements of Section 31 30 00.8. This material shall be removed and disposed of and replaced with suitable structural fill to the extent recommended by the geotechnical consultant's field representative.

Section 313000.8 Earthwork and Rough Grading

.8.1 This section shall govern the excavating for cut and the moving and placing of all fill materials necessary for grading of the general site, subgrades for roads, parking areas, buildings, and open ditches and is exclusive of the work necessary for construction of foundations for buildings, and other structures.

.8.2 General

.8.2.1 High areas shall be cut to the grade shown. All suitable material removed from the excavations shall be used, insofar as practicable, in the formation of fills and slopes. All unsuitable material or surplus excavated material shall be quantified by the construction manager and wasted or stock piled offsite by the contractor in locations obtained and maintained by the contractor. These off site stock pile areas must be accessible to the owner or his representative at all times.

.8.2.2 Roads, parking areas, and building areas shall be excavated or filled to subgrade elevations shown on the plans. Should ledge rock be encountered through cut sections, the rock shall be excavated to one foot below subgrade elevation and backfilled to the proper elevation as specified in Paragraph 31 30 00.8.3.

Section 313000.8.3 Excavations

.8.3.1 Cuts in earth occurring beneath roads and parking areas shall have a layer two feet in depth immediately below the subgrade compacted at plus or minus three percent of optimum moisture content to a density of not less than 98 percent of the maximum density as determined by ASTM D-698 or as specified on the construction plans or geotechnical report for this project.

.8.3.2 Cuts in earth occurring beneath buildings shall have a layer one foot in depth immediately below the subgrade compacted at plus or minus three percent of optimum moisture content, to a density of not less than 98 percent of the maximum density as determined by ASTM D-698 or as specified on the construction plans or geotechnical report for this project.

.8.3.3 Field density and moisture tests will be performed in accordance with ASTM D-1556, ASTM D-2167, ASTM D-2937, ASTM D-2922, ASTM D-3017, or ASTM D-2049.

Section 313000.8.4 Embankments

Embankments shall be constructed of earth in compliance with the following subparagraphs:

.8.4.1 After clearing and grubbing operations are complete, all fill areas shall be proof-rolled with heavily loaded pneumatic-tired equipment, such as 15- or 20-ton dump trucks or scrapers. Soil deflecting excessively under the moving load shall be undercut and replaced with compacted backfill. The upper 8-inch layer of material shall be compacted to a density not less than 98 percent of the maximum density as determined by ASTM D-698 or as specified on the construction plans or geotechnical report for this project.

.8.4.2 Earth fills shall be constructed of approved earth or friable materials which shall be free of organic substances, spongy or frozen soil, and other objectionable substances which will prevent satisfactory consolidation. Earth or friable materials shall be deposited and spread in successive, uniform, approximately horizontal layers not to exceed eight inches after compaction. Fill layers shall be constructed for the full width of the required cross section, and in such a manner that the embankment drains.

.8.4.3 All fills occurring beneath buildings, roads, railroads, parking areas, and storage areas shall be compacted at plus or minus three percent

of optimum moisture content to a density of not less than 98 percent of the maximum density as determined by ASTM D-698 or as specified on the construction plans or geotechnical report for this project.

.8.4.4 (Other embankments such as pond dikes shall be filled as recommended in Geotechnical Report).

.8.4.5 Field density tests will be performed in accordance with ASTM D1556, ASTM D-2167, ASTM D-2937, ASTM D-2922, ASTM D-3017, or ASTM D-2049.

Section 313000.9 Finish Grading

All exposed earth surfaces shall be finish graded to within plus or minus 0.1 foot of theoretical grade. Roadways and parking subgrade shall be finished to within plus or minus 0.1 foot of theoretical grade. The degree of finish for grading slopes shall be that ordinarily obtainable from either blade-grader or scraper operations or by hand shovel operations. When so directed, the accuracy of finish obtained by the use of templates and stringline or hand-raking methods will be required in the case of shoulders, gutters, and similar areas. All gutters and ditches shall be finished so that they will drain readily.

Section 313000.10 Maintenance and Erosion Control

.10.1 The graded areas shall be maintained by using temporary erosion and sediment control measures during construction until final acceptance by the Owner, or until subsequent building construction or pavement construction has been performed.

.10.2 The portions of the work which have been displaced due to acts of carelessness or negligence, including failure to properly route or contain surface water runoff, shall be repaired or reconstructed at no additional expense to the Owner.

.10.3 The temporary erosion control measures shall be in conformance with local, state, or federal regulations to prevent erosion and subsequent sediment deposition into receiving streams during the construction period.

.10.4 Erosion control and sediment containment measures designed to prevent concentration of runoff in erodible soil conditions, reduce velocity, or detain sediment loss shall be employed. These measures may consist of but are not limited to temporary diversions, berms, slope drains, plow barriers, or silt fences.

Section 313000.11 TESTING

.11.1 A qualified and experienced testing agency will be employed by the Owner to classify and identify soils, perform quality control testing for densities and

moisture, and to perform other testing as directed by the Owner during construction.

.11.2 Density and moisture quality control tests will be performed at the frequencies specified in the Geotechnical Report or as required by the Geotechnical Engineer retained by the owner.

.11.3 The testing agency shall establish Atterburg limits and moisture-density relationships for every change in borrow or in place soil being compacted.

.11.4 Soil shall be compacted to the degree of compaction specified within the moisture contents permitted in the approved Geotechnical Report for this project. Fill sections which are found to be deficient in compaction as a result of density testing shall be removed and replaced or reworked, according to the specification, and retested at no additional expense to the Owner.

Section 313000.12 INSPECTION

The Owner reserves the right to make inspections of the work of clearing and grubbing, grading, topsoil handling, and maintenance throughout the construction period to ensure that work is proceeding as specified on the design drawings and in this specification

SECTION 313116
TERMITE CONTROL

313116.1 General

The contractor shall provide termite treatment under the concrete slab and foundation walls by a licensed South Carolina Certified applicator. Termiticides approved are Talstar, Demon TC, Dragnet SFR or approved equal. Application shall be as required by manufacturer label and not diluted more than recommended for subterranean termite treatment. Retreat after heavy rains if not covered or area is wet. The contractor shall submit a report by Clemson Extension Agency that proper chemical amounts were used as recommended by manufacturer. Contractor shall provide a termite control bond for 5 years from date of treatment, provide for annual re-inspection of premises and provide additional treatment if termite activity is found and provide for repairs up to $100,000 of any damage caused by termites during the guarantee period at no additional cost to owner. Bond shall be renewable after 5 year warranty is completed.

SECTION 313700
RIPRAP BLANKET

313700.1 General

In areas designated on plans, provide a riprap blanket of stone and filter cloth to grades, lines and dimensions indicated or as established in the field by the Engineer. Rip-rap shall conform to Section 804 of the SCDOT Standard Specifications.

313700.2 MATERIALS

31 37 00.2.1 Stone: Hard quarry or field stone that will not disintegrate on exposure to water or weathering, suitable in every respect for purpose intended. Individual stones or pieces, except spalls, shall be not less than 12 inches in any dimension and shall range in weight from 25 lbs. to 150 lbs., with at least 50% of the pieces weighing more than 60 lbs.

31 37 00.2.2 Filter cloth: Poly-Filter X, as manufactured by Cartage or approved equal.

313700.3 CONSTRUCTION

Immediately prior to construction of riprap, the slopes or ground surfaces shall be trimmed to proper lines and grades. Where filling of depressions is required, the affected areas shall be compacted.

Plastic filter cloth shall be laid, not stretched, over surfaces to receive riprap, perpendicular to direction of flow and overlapped not less than 12 inches. Sheets shall be anchored in place with securing pins through the cloth along all edges and overlaps.

Each stone shall be carefully placed by hand, perpendicular to the slope, and firmly bedded against the plastic filter cloth and the adjoining stone. Extreme care shall be exercised to avoid the weight of the stone causing over-stressing the plastic fibers and tearing the cloth.

Spaces between larger stones shall be filled with spalls of suitable size tightly fitted into place.

The finished riprap surface shall be even, tight, true to line, grade and section. Unless otherwise indicated, minimum thickness of the complete stone layer shall be 12 inches, measured perpendicular to the surface.

End of Section

SECTION 321216
PAVING AND SURFACING

321216.1 General

321216.1.1 Work on this project shall be done in accordance with Definitions and Requirements for Highway Construction of the South Carolina State Highway Department's Standard Specifications, 1973 Edition, exclusive of Section 100. Also excluded is any section that may be amended herein.

321216.2 Preliminary Site Work

321216.2.1 Preliminary site work shall be as specified in Section 31 10 00, General Site Work, of these specifications.

321216.3 Crushed Stone Base

321216.3.1 This item shall be constructed under Section 303.04 of the South Carolina State Highway Department's Standard Specifications, compacted and in place, to the depths shown on the plans. No paving will be allowed until the base course has been inspected by the Engineer as being complete, unyielding and compacted to the required thickness. Caution shall be exercised in the mixing and manipulating of the hauled in base to ensure that the base does not include sub-grade materials. The Contractors shall provide blue tops for base completion. In addition to a proof roll per the plans witnessed by the Engineer, base thickness and compaction shall be checked every 300 feet minimum. Stone Base shall be compacted to 100% of Modified Proctor Maximum Dry Density as shown on the plans.

321216.4 Binder Course

321216.4.1 Binder course, where specified, shall comply with the South Carolina State Highway Department's Standard Specifications, Section 402. Binder course shall be Type B laid at the following rates as shown on the detail sheets:

400#/square yard for a minimum finished thickness of 4" in the SCDOT ROW

The binder course shall be compacted to 92.2 % of Modified Proctor as specified on the plan details. When used as a leveling course for uneven pavements, the 200#/square yard rate will be interpreted as an average. Where deemed necessary by the Engineer, approved automatic leveling devices shall be used with the paving machine. At least 15 days prior to the beginning of work, the contractor shall deliver a copy of the proposed job mix formula to the Engineer as required under Section 401.4 of the South Carolina State Highway Department's Standard Specifications. No samples of aggregates shall be submitted unless specifically requested in the Special Provisions or by the Engineer.

321216.5 Sand Asphalt Leveling Course

321216.5.1 Sand asphalt surface, where specified, shall comply with the South Carolina State Highway Department's Standard Specifications, Section 403, laid at a rate of 200#/square yard. When used as a leveling course for uneven pavements, the 200#/square yard rate will be interpreted as an average. Where deemed necessary by the Engineer, approved automatic leveling devices shall be used with the paving machine. At least 15 days prior to the beginning of work, the contractor shall deliver a copy of the proposed job mix formula to the Engineer as required under Section 401.4 of the South Carolina State Highway Department's Standard Specifications. No samples of aggregates shall be submitted unless specifically requested in the Special Provisions or by the Engineer.

321216.6 Bituminous Surfacing

321216.6.1 Bituminous surfacing shall be as specified in Section 403 of the South Carolina State Highway Department's Standard Specifications and laid at the type and rates given below:

Light Duty Paving -Visitor Parking Areas and Drive

Type C-HMA – 200#/square yard for a minimum finished thickness of 2" compacted to 92.2% maximum specific gravity per details shown on plans. Final measured thickness of asphalt shall not be less than 2".

Heavy Duty Paving – Employee Parking and Drive and FMU Entrance Road:

Intermediate Course
Type C-HMA – 2000#/square yard for a minimum finished thickness of 2" compacted to 92.2% maximum specific gravity per details shown on plans. This paving shall be installed in one 2" layers.

Surface Course
Type C-HMA – 150#/square yard for a minimum finished thickness of 1 1/2" compacted to 92.2% maximum specific gravity per details shown on plans. This paving shall be installed in one 1.5" layers

SCDOT – Surface Course

Type B- HMA - 200#/square yard for a minimum finished thickness of 2" compacted to 92.2% maximum specific gravity per details shown on plans. Final measured thickness of asphalt shall not be less than 2".

Where deemed necessary by the Engineer, approved automatic leveling devices shall be used with the paving machine. At least 15 days prior to the beginning of work, the contractor shall deliver a copy of the proposed job mix formula to the Engineer as required under Section 401.4 of the South Carolina State Highway Department's Standard Specifications. No samples of aggregates shall be submitted unless specifically requested in the Special Provisions or by the Engineer.

321216.7 Patching

321216.7.1 Patching for utility cuts shall be performed as detailed on the plans. Unless otherwise specified, asphalt shall be Type 2 as specified in the South Carolina State Highway Department's Standard Specifications, Section 403. All existing pavements shall be sawed or air hammer cut to the dimensions shown on the plans before patching is accomplished.

321216.8 Field Laboratory

321216.8.1 Unless specifically called for in the Bid Proposal and/or Special Provisions, the contractor will not be required to maintain a field laboratory as specified in the South Carolina State Highway Department's Standard Specifications, Section 401.12. The contractor will be expected, however, to assist with any sampling or testing to be accomplished by the Engineer.

SECTION 321600
CURB AND GUTTER

321600.1 General

The work covered under this section of these specifications shall be for the construction of curb and gutter as detailed on the plans in accordance with South Carolina Department of Transportation's (SCDOT) Standard Specifications, latest edition, or as amended herein.

321600.2 Concrete Gurb and Gutter

All curb and gutter work performed under this section shall be an 18" standard curb section as detailed on the plans with the exception to the curb and gutter along the parent drop off loop which shall be rolled curb. The curbs shall be poured in accordance with SCDOT Section 721. Curbs shall be returned neatly into all street sections that have different curb sections or no curbs at all. Construction joints shall be placed the (10') feet on centers and expansion joints every thirty (30') feet. No reinforcement is required.

SECTION 321623
CONCRETE SIDEWALKS

321623.1 General

The work covered under this section of these specifications shall be for the construction of concrete sidewalks as detailed on the plans in accordance with SCDOT Standard Specifications, latest edition, or as specified otherwise herein.

321623.2 Concrete Sidewalks

All walks under this section will be governed by Section 720 of SCDOT Standard Specifications for Highway Construction, 1986, latest edition, in its entirety and as detailed in the plans. If not indicated on the drawings, construction joints to be placed ten (10') on centers and expansion joint every thirty (30') feet in the sidewalks. Reinforcement shall be 6x6 WWF. Where sidewalk is 5' wide contractor shall install a control joint every 5' or as specifically indicated on the Architectural Plans. Where sidewalks are shown to be utilized as curbs also, the curb edge shall be constructed as shown on the detail sheet.

SECTION 329200
TEMPORARY EROSION CONTROL GRASSING

329200.1 General

1.1 This work shall consist of seeding, fertilizing, liming when specified, mulching, and applying nitrogen when specified on all areas shown on the plans or where directed by the Engineer all in accordance with these specifications.

329200.2 Materials

2.1 Seed. All seed shall conform to all State laws and to all requirements and regulations of the South Carolina Department of Agriculture.

The several varieties of seed shall be individually packaged or bagged, and tagged to show name of seed, net weight, origin, germination, lot number, and other information required by the Department of Agriculture.

The Engineer reserves the right to test, reject, or approve all seed before seeding.

Mixtures of different types of seed called for in the seeding schedule shall be weighted and mixed in the proper proportions at the site of the work in the presence of the Engineer.

Unless otherwise provided, the Contractor may select the type of seeding from the table shown below for the upper state and the lower state.

The total pounds of seed per acre shall be the sum total shown for all the varieties of seed opposite the schedule number in the seeding schedules below:

Seeding Schedules for Temporary Vegetation
Upper and Lower State

Schedule No.	Common Name of Seed	Planting Rate	Rate	Dates
1	Annual Sudan Grass (Sweet or Tift)	40		Apr. 1 –Aug.15
2	Brown Top Millet	50		Apr. 1 - Aug. 15
3	Rye Grain	55		Aug. 16-Mar. 31
	Annual Ryegrass	15		

2.2 Commercial Fertilizers. Commercial fertilizers shall comply with State fertilizer laws.

In a mixed fertilizer such as 4-12-12, the first number shall represent the minimum percent of nitrogen required, the second number shall represent the minimum percent of

available phosphoric acid required, and the third number shall represent the minimum percent of water-soluble potash required in the fertilizer.

2.3 Lime. Lime shall be agricultural grade, ground limestone and shall conform to the requirements of the S.C. Department of Agriculture.

2.4 Emulsified Asphalt SS-1. Emulsified Asphalt SS-1 shall meet the requirements of Subsection 406.06 of the SCDOT standard specifications.

2.5 Emulsified Asphalt RS-2. Emulsified Asphalt RS-2 shall meet the requirements of Subsection 406.06 of the SCDOT standard specifications. The RS-2 emulsion shall be diluted at the manufacturing plant with an equal amount of water. The resulting material shall be homogenous and satisfactory for spraying.

2.6 Straw Mulch. Straw mulch material shall consist of straw or hay. Straw shall be stalks of wheat, rye, barley, oats, or other approved straw. Hay shall consist of timothy, pea vine, alfalfa, coastal bermuda, or other grasses from approved sources. These materials shall be reasonably dry and shall be reasonably free from mature seed-bearing stalks, roots, or bulblets of Johnson Grass, Nutgrass, Sandbur, Wild Garlic, Wild Onion, Wild Mustard, Crotolaria, Pigweed, Witch weed, and Cocklebur. The Contractor shall also comply with all State and Federal domestic plant quarantine regulations.

2.7 Excelsior Mulch. Excelsior mulch shall consist of wood fibers cut from sound, green timber. The average length of the fibers shall be 4 to 6 inches. The cut shall be made in such a manner as to provide maximum strength of fiber, but at a slight angle to the natural grain of the wood so as to cause splintering of the fibers when weathering in order to provide adherence to each other and to the soil.

2.8 Wood Cellulose Fiber Mulch. Wood cellulose fiber mulch shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. It shall remain in uniform suspension in water under agitation and blend with grass seed and fertilizer to form homogeneous slurry.

The mulch fibers shall intertwine physically to form a strong moisture-holding mat on the ground surface and allow rainfall to percolate the underlying soil. The mulch shall be heat processed so as to contain no germination or growth-inhibiting factors. It shall be dyed (non-toxic) an appropriate color to facilitate metering of material.

Suppliers shall be prepared to certify that laboratory and field-testing of their product has been accomplished, and that it meets all of the foregoing requirements based upon such testing.

Weight specifications of this material from suppliers and for all applications shall refer only to air-dry weight of the fiber material. Absolute air-dry weight is based on the normal weight standard of the Technical Association of the Pulp and Paper Industry for wood cellulose and is considered equivalent to 10 per cent moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air-dry weight content.

329200.3 Installation

3.1 Stand of Grass. Before acceptance of the seeding performed for the establishment of permanent vegetation, the Contractor will be required to produce a satisfactory stand of perennial grass per SCDHEC standards whose root system shall be developed sufficiently to survive dry periods and the winter weather and be capable of reestablishment in the spring.

Before acceptance of the seeding performed for the establishment of temporary vegetation, the Contractor will be required to produce a stand of grass sufficient to control erosion for a given area and length of time before the next phase of construction or the establishment of permanent vegetation is to commence.

3.2 Seeding Dates and Rates of Application. Seeding shall be performed during the periods and at the rates specified in the seeding schedules. Seeding work may, at the discretion of the Contractor, be performed throughout the year using the schedule prescribed for the given period. Seeding work shall not be conducted when the ground is frozen or excessively wet. The Contractor will be required to produce a satisfactory stand of grass regardless of the period of the year the work is performed.

3.3 Preparation of Ground Before Seeding. The areas to be seeded shall be made smooth and uniform and shall conform to the finished grade and cross section shown on the plans or as otherwise designated. Minor shaping and smoothing of uneven and rough areas outside the graded section shall be performed as directed by the Engineer in order to provide for more effective erosion control and for ease of subsequent mowing operations.

The seedbed, if not loose, shall be loosened to a minimum depth of 3 inches before agricultural lime, fertilizer or seed is applied. The areas to be seeded shall be cleared of stones larger than 2-1/2 inches in any dimension, roots, and other debris.

3.4 Applying Lime and Fertilizer. Following advance preparation, and placing selected material for shoulders and slopes when called for in the contract -- lime if called for--and fertilizer shall be spread uniformly over the designated areas and shall be thoroughly mixed with the soil to a depth of approximately 2 inches. Fertilizer shall be applied at the rate of 500 pounds per acre for the initial application unless otherwise directed. Lime shall be applied at the rate specified in the proposal or as authorized by the Engineer. Unless otherwise provided, lime will not be applied for temporary seeding. In all cases where practicable, approved mechanical spreaders shall be used for spreading fertilizer and lime. On steep slopes subject to slides and inaccessible to power equipment, the slopes shall be adequately scarified. Fertilizer may be applied on steep slopes by hydraulic methods as a mixture of fertilizer and seed. When fertilizer is applied in combination seed and fertilizer drills, no further incorporation will be necessary. The fertilizer and seed shall be applied together when the method of seeding (Wood Cellulose Fiber Mulch) is used. Any stones larger than 2-1/2 inches in any dimension, larger clods, roots, or other debris brought to the surface shall be removed.

3.5 Seeding (Unmatched). Seed shall be sown within 24 hours following the application of fertilizer and lime and preparation of the seedbed as specified in Subsection 503.3.4. Seed shall be uniformly sown at the rate specified by the use of approved mechanical seed drills. Rotary hand seeders, power sprayers or other satisfactory equipment may be used on steep slopes or on other areas that are inaccessible to seed drills.

The seeds shall be covered and lightly compacted by means of a cultipacker or light roller if the drill does not perform this operation. On slopes inaccessible to compaction equipment, the seed shall be covered by dragging spiked chains, by light harrowing or by other satisfactory methods.

Within 24 hours following compaction of the seeded areas, Emulsified Asphalt RS-2, diluted at the manufacturing plant with an equal amount of water, shall be uniformly applied over the seeded areas at a rate of 0.15 to 0.32 gallon of the dilution per square yard. The exact amount shall be as fixed by the Engineer.

If permitted by the special provisions, wood cellulose fiber mulch or excelsior fiber mulch used and applied as specified for Methods B and C may be used and the 0.15 to 0.32 gallon of the diluted emulsion omitted.

3.6 Seeding (Mulched) Seeding (mulched) shall be performed as specified in Method B. Method B or C will not be permitted except when indicated in the special provisions.

Method A. Seeding (Straw or Hay Mulch). Seed shall be sown as specified in Paragraphs one and two of Subsection 32 92 00.3.5. Within 24 hours following covering of the seed, straw or hay mulch material shall be uniformly applied at the rate of 2 tons per acre. Mulch may be spread either by hand, by appropriate mechanical spreaders, or by blowers. The mulch shall allow sunlight to penetrate and air to circulate but also partially shade the ground and conserve soil moisture. The newly laid mulch shall be held in place as specified in (92); (1) shall not be used unless permitted in the special provisions.

(1) Emulsified Asphalt SS-1 shall be injected into the mulch as it leaves the power driven mulch spreader. The amount shall be approximately 150 gallons per ton of mulch material. The exact amount shall be as fixed by the Engineer and shall be the amount necessary to bond together the mulch particles without giving a heavy coating of the asphalt material and shall prevent wind erosion. Displaced mulch shall be replaced.

(2) Emulsified Asphalt RS-2 shall be diluted at the manufacturing plant with an equal amount of water and shall be uniformly applied over the mulch material as a film. The film shall be applied at approximately 0.20 gallon of dilution per square yard and shall be sufficient to bond together the mulch particles without giving a heavy coating of the asphalt material and shall prevent wind erosion. Displaced mulch shall be replaced.

Method B. Seeding (Wood Cellulose Fiber Mulch). After the lime has been applied and ground prepared as specified in Subsection 32 92 00.3.5, wood cellulose fiber mulch shall be applied at the rate of 1,500 pounds per acre in a mixture of seed and fertilizer. Hydraulic equipment shall be used for the application of fertilizer, seed, and slurry of the prepared wood pulp. This equipment shall have a built-in agitation system with an operating capacity sufficient

to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, and water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles that will provide even distribution of the slurry on the various areas to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons.

The seed, fertilizer, wood pulp mulch and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by the hydraulic seeding method specified herein. The materials shall be combined in a manner recommended by the manufacturer. The slurry mixture shall be so regulated that the amounts and rates of application shall result in a uniform application of all materials at rates not less than the amounts specified. Using the color of the wood pulp as a guide, the equipment operator shall spray the prepared seedbed with a uniform visible coat. The slurry shall be applied in a sweeping motion, in an arched stream, so as to fall like rain, allowing the wood fibers to build upon each other until an even coat is achieved.

Method C. Seeding (Excelsior Mulch). Seed shall be sown as specified in Paragraphs one and two of Subsection 32 92 00 3.5. Within 25 hours after the covering of seed, excelsior mulch shall be uniformly applied at the rate of 2 tons per acre. The mulch may be applied hydraulically or by other approved methods. Should the mulch be placed in a dry condition, it shall be thoroughly wetted immediately after placing. The Engineer may require light rolling of the mulch to form a tight mat.

3.7 Protection of Structures. Before spraying emulsified asphalt, the Contractor shall cover any parts of bridges, culverts, guardrail, signs, sidewalk, curb and gutter, catch basins, pipe ends and other structures as necessary to prevent discoloration.

3.8 Second Application of Fertilizer. After the plants have become established, fertilizer shall be applied on permanent vegetation uniformly in dry form at the rate of 500 pounds per acre on the areas designated by the Engineer. Fertilizer may, at the discretion of the Engineer, upon receipt of satisfactory evidence of its feasibility from the manufacturer, be applied in liquid form. Unless otherwise provided, temporary vegetation will not receive a second application of fertilizer. When two different types of fertilizer are set up in the proposal, the fertilizer with the less nitrogen content shall be applied to the areas where sericea lespedeza predominates.

3.9 Application of Nitrogen. As soon as the plants show satisfactory growth, actual nitrogen shall be applied evenly at the rate of 48 pounds per acre on the areas designated by the Engineer. Unless otherwise permitted, the nitrogen shall be applied in a solid form rather than in a liquid state. Nitrogen shall not be applied to stands of sericea lespedeza. Unless otherwise provided, nitrogen will not be applied to temporary vegetation.

3.10 Maintenance. The Contractor will be required to do all maintenance necessary to keep seeded areas in a satisfactory condition until the work is finally accepted. This includes mowing and repairing washes, and additional seed, fertilizer and mulch applied to areas where a satisfactory stand of grass has not been achieved.

SECTION 329201
PERMANENT TURF, GRASSES, AND SOD

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. Seeding.
2. Hydroseeding.
3. Sodding.
4. Sprigging.
5. Erosion-control material(s).

1.3 SUBMITTALS

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

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

B. 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.

C. Certification of Sod: From sod vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage purity, germination, and weed seed. Include the grower name, year of production and date of packaging.

D. Qualification Data: For qualified landscape Installer.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Land care Network or the American Nursery and Landscape Association.
2. Experience: Three years' experience in turf installation.
3. Installer's Field Supervision: Require installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

5. Pesticide Applicator: State licensed, commercial.

B. Sod Producer: Company specializing in sod production and harvesting with a minimum 5 years' experience and certified by the State of South Carolina, Georgia or North Carolina.

C. 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.

D. 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; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. Six representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes (one per athletic field).
3. Report suitability of tested soil for turf growth.

a. Based on 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 turf.
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.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 01 "Project Meetings".

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. 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. Planting Restrictions: Coordinate installation of seed and sod during normal planting seasons for each type of plant material required.

B. 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. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until Final Completion of project.

1.8 WARRANTY

A. It is the responsibility of the Contractor to make known any site conditions which may be harmful or growth inhibiting to the plant materials specified, prior to acceptance or installation of said materials.

B. Special Warranty: Installer agrees to repair or replace turf 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 during 12-month warranty period, or incidents that are beyond Contractor's control. Warranty shall cover any plant loss due to weather damage to plants installed out of normal planting season.

2. Warranty Periods from Date of Substantial Completion:
a. Seed, Hydroseed, and New Sod (provided in this contract): 12 months.

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. Full Sun: Bermudagrass (Cynodon dactylon), unhulled.
2. Sun and Partial Shade: Proportioned by weight as follows:

a. 50 percent Bermudagrass (Cynodon dactylon), unhulled.
b. 50 percent perennial ryegrass (Lolium perenne).

2.2 TURFGRASS SOD

A. Turfgrass Sod: ASPA Certified, approve nursery grown grade; cultivated grass sod; minimum 18 months to replace damaged turf. Furnish viable sod of uniform density, color, and texture, with strong fibrous root system, free of stones, burned or bare spots, disease, nematodes, soil borne insects and containing no more than 5 weeds per 1000 sq. ft. Provide sod of uniform pad sized with maximum 5% deviation in either length or width. Broken pads or pads with uneven ends will not be acceptable. Sod pads incapable of supporting their own weight when suspended vertically with a firm grasp on upper 10% of pad will be rejected.

1. Tifway 419 Bermuda.

2.3 SPRIGS

A. Sod Sprigs: Healthy living stems, rhizomes, or stolons with a minimum of two nodes and attached roots free of soil, of the following turfgrass species:

1. Tifway 419 Bermuda.

2.4 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.5 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source- separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.6 FERTILIZERS

A. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.7 PLANTING SOILS

A. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 4 > percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

2.8 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.9 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

C. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 3-inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Invisible Structures, Inc.; Slopetame 2.
b. Presto Products Company, a business of Alcoa; Geoweb.
c. Tenax Corporation - USA; Tenweb.

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 4 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 superphosphate 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 a depth of 4 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 2 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 superphosphate 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 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

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 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 2 lb/1000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal. /1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

G. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

3.6 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydro seed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre.

3.7 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

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 1:6 with wood pegs or steel staples spaced as recommended 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.

3.8 SPRIGGING

A. Plant freshly shredded sod sprigs in furrows 1-1/2 to 2 inches deep. Place individual sprigs with roots and portions of stem in moistened soil, 12 inches apart in rows 18 inches apart, and fill furrows without covering growing tips. Lightly roll and firm soil around sprigs after planting.

3.9 TURF MAINTENANCE

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 remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. 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.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. 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 perennial ryegrass to a height of 1 to 2 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.

3.10 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, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.11 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.

C. Remove nondegradable erosion-control measures after grass establishment period.

SECTION 330130
EPOXY LINING FOR WETWELL AND MANHOLE INTERIORS

330130.1 - GENERAL

330130.1.1 DESCRIPTION

A. Work included: Provide for all manholes, wetwells, structures, etc. as shown on the drawings, specified herein, and needed for a complete and proper installation.

B. This specification includes the materials and application of a corrosion-resistant, spray-applied, solvent-free epoxy lining to all interior concrete surfaces, and inverts to provide resistance to hydrogen sulfide and acid attack from microbiological sources.

C. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these specifications.
2. Section 02722 - Sewers: Sanitary, Gravity.
3. Section 02723 - Sewers: Sanitary, Pressure.
4. Section 02751 - Plant Piping, Valves and Appurtenances.

330130.1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Referenced manufacturer of coating system is Raven Lining Systems, Inc. of Tulsa, OK, and is named to establish standards of quality. Products of other manufacturers complying with these specifications may be provided upon approval by the Engineer.

C. The Contractor and applicable subcontractors must make a pre-bid site visit to visually inspect existing site conditions. A site visit may be arranged with the Owner's representative listed in Section 00800.

D. All work under this Section is to be performed by personnel qualified and certified by the manufacturer of the products.

E. Applicator Qualifications:

1. Provide written certification from the protective coating manufacturer that the Applicator's personnel are trained and approved in the handling, mixing and application of the products to be used.
2. Provide written certification by the protective coating manufacturer that the equipment to be used for applying the products has been approved and

Applicator's personnel have been trained and certified for proper use of the equipment.

3. Five (5) recent references of Applicator (projects of similar size and scope) indicating successful application of a high-build solvent-free epoxy coating by spray application. Provide references upon request.
4. Proof of any necessary federal, state or local permits or licenses necessary for the project.

F. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE and SSPC standards and the protective coating manufacturer's recommendations.

G. A NACE Certified Coating Inspector or SSPC Certified Protective Coating Inspector shall be provided by the contractor. The Inspector will provide the owner with a written report confirming adherence to these specifications, to include proper procedure and equipment usage for preparation, application, and material handling.

H. Warranty: Applicator shall warrant all work against defects in materials and workmanship for a period of five (5) years, unless otherwise noted, from the date of final acceptance of the project. Applicator shall, within a reasonable time after receipt of written notice thereof, repair defects in materials or workmanship which may develop during said five (5) years period, and any damage to other work caused by such defects or the repairing of same, at his own expense and without cost to the Owner.

330130.1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01340.

B. Product data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements, including ASTM test results.
3. Material Safety Data Sheets (MSDS) for each product used.
4. Project specific guidelines and recommendations from the coating manufacturer.

C. Provide written certification from the coating manufacturer regarding personnel performing the work.

D. Provide written certification from the coating manufacturer regarding equipment used to perform the work.

330130.1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

B. Materials are to be kept dry, protected from weather and stored under cover.

C. Protective coating materials are to be stored between 50° F and 90° F. Do not store near flame, heat or strong oxidants.

D. Protective coating materials are to be handled according to their material safety data sheets.

330130.2 - PRODUCTS

330130.2.1 GENERAL

A. Provide a leak-resistant lining system consisting of properly prepared substrate, approved repair materials, and solvent-free epoxy coating.

330130.2.2 EXISTING PRODUCTS

A. Standard Portland cement or new concrete properly cured for 28 days prior to application of the protective coating.

B. Remove existing coatings prior to application of the new protective coating. Maintain strict adherence to applicable NACE and SSPC recommendations with regard to proper surface preparation and compatibility with existing coatings.

330130.2.3 LINER MATERIALS

A. Infiltration control mix:

1. Provide a rapid setting cementitious product specifically formulated for leak control, used to stop minor water infiltration and mixed and applied according to manufacturer's recommendations and have the following minimum requirements:
   a. Compressive Strength (ASTM C109)- 600 psi, 1 hr.
   b. Bond (ASTM C321) - 40 psi, 4 hrs.
   c. Set Time - 60 seconds
2. Acceptable products:
   a. Strong-Plug as manufactured by Strong-Seal Systems, Corp.
   b. Quad-Plug as manufactured by Quadex, Inc.

B. Chemical grout (leak repair):

1. Provide a polymer solution that reacts freely with water to form a strong film, gel, or foam of polyurethane, designed for stopping very active infiltration.
2. Acceptable product:
   a. 920 PrimeFlex as manufactured by Prime Resins, Inc.

C. Underlayment Grout:

1. Provide a quick setting cementitious material, designed to fill large voids and repair or reconstruct inverts, mixed and applied according to manufacturer's recommendations, meeting the following minimum requirements:
   a. Compressive Strength (ASTM C109)- 1400 psi, 6 hrs.

b. Flexural Strength (ASTM 348) - 450 psi, 1 hr.
c. Bond (ASTM C321) - > 130 psi, 28 days
d. Density, when applied - 105 ± 5 pcf

2. Acceptable products:
   a. QSR as manufactured by Strong-Seal Systems, Corp.
   b. Hyperform as manufactured by Quadex, Inc.

D. Cementitious Base (calcium aluminate):

1. Provide a base made with calcium aluminate cement and 100% calcium aluminate aggregate, used to form a structural/structurally enhanced monolithic liner covering all interior manhole surfaces and have the following minimum requirements at 28 days:
   a. Compressive Strength (ASTM C109) - >9000 psi
   b. Tensile Strength (ASTM C496) - >800 psi
   c. Flexural Strength (ASTM C293) - >1200 psi
   d. Shrinkage @ 90% relative humidity(ASTM C596) - 0%
   e. Bond (ASTM C882) - >1600 psi
   f. Freeze/Thaw (ASTM C666) - 100 cycles, no damage
2. Acceptable products:
   a. Sewper Coat Pumpable Grade as manufactured by LaFarge Calcium Aluminates.
   b. Strong Seal High Performance mix as manufactured by Strong-Seal Systems, Corp.
   c. Aluminaliner as manufactured by Quadex, Inc.
3. Cementitious application equipment:
   a. Use specially designed machines consisting of a 3-stage progressive cavity rotor-stator style pump capable of producing a minimum of 250 psi pumping pressure, a vertical shaft mixer with twin horizontal mixing paddles, and a minimum 12 cfm/90 psi air system for spray application of the mortar for applying cementitious materials. Use equipment that includes a water storage system, and water metering device. Use a Material hydraulically powered.mixer and pump.
   b. Use the Quadex SprayMaster or Strong-Seal Spraymate for applying the corrosion resistant cementitious materials.

E. Epoxy liner:

1. Provide a high build solvent-free epoxy coating formulated with high physical strengths and chemical resistance to be applied in a multiple pass application to form a monolithic coating within the structure. Provide a product with the following minimum requirements:
   a. Flexural Strength (ASTM D790) - >13,000 psi
   b. Compressive Strength (ASTM D695) - >18,000 psi
   c. Tensile Strength (ASTM D638) - > 7,600 psi
   d. Ultimate Elongation (ASTM D638) - 1.50 %
   e. Hardness (ASTM D2240) - 88
   f. Water Vapor Transmission (ASTM D1653) - 3.8 gms/sq.m (24 hrs)
   g. Adhesion (ASTM D4541) - concrete substrate (concrete) failure

2. Acceptable product:
   a. Raven 405 as manufactured by Raven Lining Systems.
3. Epoxy application equipment:
   a. Use specially designed heated plural component airless spray equipment in the application of the specified coating.
   b. The proportioning and dispensing system shall consist of a plural component proportioning pump, plural component heated hose, mix manifold, and an airless spray gun with manufacturer specified tip.

330130.2.4 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

330130.3 - EXECUTION

330130.3.1 BEGINNING WORK

A. Provide all materials, labor, equipment, etc. required to perform Work.

B. Inspect structures to determine methods of leak repairs.

C. Promptly inform Engineer of errors or discrepancies found, in order that proper corrections may be made.

D. Follow all manufacturer's instructions regarding surface preparation, product application and curing.

330130.3.2 TEMPERATURE OF WORKING AREA

A. Temperature of working area must be between 35° F and 90° F.

B. Store materials within the 65° F to 80° F range for 48 hours prior to use.

C. Do not apply in direct sunlight or where rising surface temperatures may result in blistering of the materials due to expansion of entrapped air or moisture in the concrete or grout.

D. When the surface temperatures are rising, postpone the application or apply during cooler hours.

330130.3.3 SURFACE PREPARATION

A. New concrete:

1. Concrete must be sufficient strengths to support cured material.
2. Concrete surfaces that have been cured with conventional curing

compounds or are contaminated with form oils or grease must be chemically cleaned or scarified to remove the contaminants prior to abrasive blasting or hydroblasting.

3. Suitably finished concrete must have a uniform surface texture, exposing fine aggregate and resembling coarse sandpaper.
   a. If surface texture is not uniform in appearance, repeat abrasive blasting or hydroblasting until the desired surface is obtained.
4. After surface preparation, fill all voids with underlayment grout.

B. Existing concrete:

1. Abrasive blast or hydroblast concrete to achieve hard firm surface. Hydroblast using pressure water spray of minimum 5000 psi at 5 gpm.
2. After blasting, detergent wash to remove remaining oil, grease and other contaminants.
3. Repair all structural defects, voids, or cracks in substrate.
4. Fill in defect voids with underlayment grout.
5. Where necessary to restore the concrete substrate, attach 2" x 2" x 10 or 12 gauge wire mesh to the concrete, then apply the underlayment grout.

C. Brick manholes:

1. Remove all oil, grease, chemicals and paints or protective coatings from the brick by chemical cleaning prior to hydroblasting or abrasive blasting.
2. Abrasive blast or hydroblast surface to achieve hard firm surface. Hydroblast using pressure water spray of minimum of 5000 psi at 5 gpm.
3. After blasting, detergent wash to remove remaining oil, grease and other contaminants.
4. Remove all foreign particles and attacked or unsound mortar from the joints.
5. Regrout loose brickwork with underlayment grout to ensure structural integrity of the manhole.

D. All surfaces must be free of dust, loose particles, oils, grease, chemical contaminants and previously applied paints or protective coatings.

E. All surfaces are to be dry after completion of surface preparation.

330130.3.4 STOPPING ACTIVE LEAKS

A. After surface cleaning, seal all visible leaks with a specified material.

B. Stop minor infiltration using infiltration control mix.

C. Stop larger leaks using chemical grout.

D. Provide weep holes as required to localize the infiltration during the application. Repair weep holes prior to applying liner coats.

330130.3.5 APPLICATION OF LINER

A. New Concrete:

1. Mix all products in accordance with manufacturers instructions.
2. Spray-apply the epoxy coating finish to a minimum thickness of 120 mils.

B. Existing Concrete:

1. Mix all products in accordance with manufacturers instructions.
2. Spray-apply the calcium aluminate base at a minimum 1/2" thickness.
   a. Trowel and brush finish material immediately following the spray application.
3. Spray-apply the epoxy coating finish over the calcium aluminate base, to a minimum thickness of 120 mils.

C. Brick Surfaces:

1. Mix all products in accordance with manufacturers instructions.
2. Spray-apply the calcium aluminate base at a minimum of 1" thickness.
   a. Trowel and brush finish material immediately following the spray application.
3. Spray-apply the epoxy coating finish over the calcium aluminate base, to a minimum thickness of 120 mils.

330130.3.6 INSPECTION AND TESTING

A. During application, a wet film thickness gage, such as those available through Paul N. Garner Company, Inc. meeting ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.

B. Inspect the protective coating after it has set hard to the touch with high voltage holiday detection equipment.

C. Initially set the spark tester at 100 volts per 1 mil (25 microns) of film thickness applied.

D. Mark all detected holidays and repair by abrading the coating surface with a minimum of 60-grit sandpaper or other manufacturer approved hand-tooling method.

E. After abrading and cleaning, hand apply additional protective coating material to the repair area.

F. All touch-up and repair procedures are to be performed in strict accordance with the protective coating manufacturer's recommendations.

330130.3.7 CLEAN-UP OPERATIONS

A. Use proper procedures for waste disposal of all residues, adhering to manufacturer's recommendations.

B. Disposal to be at a sanitary landfill site or other approved disposal site.

C. All equipment and work areas to be cleaned properly and completely.

D. Failure to maintain work sites properly cleaned up will be sufficient cause for withholding of monthly payments to the Contractor.

330130.3.8 MEASUREMENT AND PAYMENT

A. Payment for all work under this Section will be included in the lump sum bid or the cost of the unit price item to which it is applied. No separate payment for this work will be made.

SECTION 331000
PVC WATER SERVICES

331000.1 General

.1.1 PVC water service lines shall be constructed of polyethylene service pipe as manufactured under the Commercial Standard Specifications CA 266-63 and as approved by NSF for 160 psi working pressure and a bursting pressure of 630 psi. All materials/products that contact potable water must be third party certified as meeting the specifications of ANSI/NSF Standard 61. The certifying party shall be accredited by the ANSI.

331000.2 Service Saddles

811.2.1 Service saddles shall be a McDonald 3801 or equal.

331000.3 Corporation Stops

.3.1 The corporation stops shall be brass - Mueller Type H15000 or equal.

331000.4 Curb Stop

811.4.1 The curb stops shall be Mueller H-15174 or equal.

331000.5 Meter Boxes

.5.1 Meter boxes shall be concrete boxes, Brooks 75 or equal.

331000.6 Water Meters

.6.1 Meters shall be furnished by Byrd Property Ventures.

331000.7 Service Backflow Preventers

.7.1 Backflow preventers shall have been tested and certified to meet or exceed the proposed provisions of ASSE Standard 1024. The backflow preventer shall be furnished by the contractor.

SECTION 331100
WATER LINES

331100.1 General

.1.1 Pipe shall be type, size, class and diameter as hereinafter specified and called for by the plans and/or bid form. Nominal laying lengths may also be specified herein or by the Engineer as conditions warrant.

.1.2 All standards cited in this specification refer to the latest revision of that standard under the same specification number or to superseding specifications under a new number.

.1.3 All pipe, fittings, packing, jointing materials, valves, and fire hydrants shall conform to Section C of the American Water Works Association (AWWA) Standards. (R61-58.4.d. (1)) or the Manufacturer's recommended installation procedures.

331100.2 Material

.2.1 PVC water pipe shall be furnished as specified by ASTM D 2241, AWWA C-900 for pipes 4"-12" in diameter.

.2.1a PVC water pipe for potable water distribution lines shall be AWWA C900 Class 100 as shown on the plans.

.2.1b Material Specification of Internal Underground Fire Protection Lines.
PVC water pipe for internal fire protection lines shall be AWWA C900 DR 14 as shown on the plans, and shall conform to NFPA 24 "Standard Installation of Private Fire Service Mains" 2019 Edition and 2021 IBC Edition.

.2.1c Testing of Internal Underground Fire Protection Lines
Underground piping shall be flushed and hydrostatically tested per NFPA 24 (2016 Ed.) Section 10.10.2. Flushing shall conform to Section 10.10.2.1.1 and pipe shall be hydrostatically tested per NFPA 24 (2019 Ed.) Section 10.10.2.2. Pipe will be pressure tested at 200 psi for 2 hours minimum. Testing Allowance will be as specified in NFPA 24 (2019 Ed.) Section 10.2.2.2.6. The Contractor will be required to submit a "Contractor's Material & Test Certificate for Underground Piping" as found in Section 10.10.2 of NFPA 24 (2019 Ed.)

.2.1d General Material Specifications

PVC ASTM D1785 or ASTM D2241: SD 26 Class 160 and SD 21 Class 200 (for pipes 12" in diameter and smaller).PVC AWWA C905 (for pipes 14 inches through 48 inches in diameter
Steel: AWWA C200 or ASTM A53 or A120

HDPE AWWA C906 for pipes (4 inches to 63 inches)Valves: AWWA C500 (Metal Seated Gate Valve), C504 (Butterfly Valve) or C509 (Resilient Seated Gate Valve)
Hydrants: AWWA C502

.2.2 DIP shall be furnished as specified: AWWA C150/21.50 & AWWA C151/A21.51.

.2.2 Joints shall be of the type specified and as described in AWWA C-900, Section 2.3. Gaskets shall conform to ASTM D-3139.

.2.3 The pipe marking shall include:

a) Nominal size and O.D. base (e.g., 8" IPS)
b) Material code designation (PVC 1120)
c) Dimension ratio number, (DR 18 or 25)
d) Pressure class: 6" dia. size or larger (100 or 150)
e) ASTM D 2241 -- AWWA C-900
f) Manufacturer's name or trademark and production code
g) Seal of the testing agency that verified the suitability of the pipe material for potable water service (NSF)

.2.4a Solvent weld PVC pipe and fittings shall not be used in water mains (4) inches and larger.

.2.4 All materials/products that contact potable water must be third party certified as meeting the specifications of ANSI/NSF Standard 61. The certifying party shall be accredited by the ANSI.

331100.3 Installation

.3.1 The installation of water mains and appurtenances shall be conducted in accordance with Section C of the AWWA Standards and/or the manufacturer's recommended installation procedures. In addition, PVC Water Lines shall be laid in general conformance with ASTM D 2321. All pipe shall be laid to, and maintained at the required lines and grades. Fittings, valves, air vents and hydrants shall be installed at the required locations with valve and hydrant stems plumb. No deviation shall be made from the required line or grade without approval in writing from the Engineer or his representative.

The contractor at his own expense shall furnish temporary support, adequate protection, and maintenance of all underground and surface utility structures, drains, sewers and other structures encountered in the process of the work. Where the grade or alignment of the pipe is obstructed by existing utility structures such as conduits, ducts, pipes, branch connections to main sewers, or main drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the contractor in cooperation with the owners of such utility structures. Whenever necessary to determine the location of existing underground utility structures, the

contractor, after an examination of available records, shall make all explorations and excavations for such purpose as may be directed by the Engineer.

All pipe shall be laid to depth of cover shown on the contract drawings or as directed by the Engineer in writing. The depth of cover shall be measured from the established street grade or the surface of the permanent improvement to the top of the pipe barrel.

.3.2 Excavations and Trenches shall be dug to the required alignment and depth shown on the drawings or as subsequently approved in writing by the Engineer, and only so far in advance of pipe laying as permitted by the supplementary specifications.

Where necessary to prevent caving, trench excavations in unstable soil shall be adequately supported. As backfill is placed and sheeting is withdrawn, the void left by the withdrawn sheeting shall be filled and compacted before withdrawing the next increment.

The trench width at the ground surface may vary with, and depend upon; its depth, the nature of the ground encountered, and surface structures to be preserved. The minimum clear width of unsheeted or sheeted trench measured at the horizontal diameter of the pipe shall be eighteen inches or one foot greater than the outside diameter of the barrel of the pipe, whichever is greater. The maximum clear width of the trench at the top of the pipe shall be no more than the outside barrel of the pipe plus two feet. Greater width of the trench at the top of the pipe shall be only on written approval of the Engineer.

The trench bottom shall be constructed to provide a firm, stable and uniform support for the full length of the pipe. Bell holes at each joint shall be provided to permit the joint to be made properly.

Any part of the trench excavated below grade shall be backfilled to grade with material and to the compaction degree as approved by the Engineer. When an unstable subgrade condition is encountered and, in the opinion of the Engineer, it cannot support the pipe, an additional depth shall be excavated and refilled to pipe foundation grade with material approved by the Engineer.

Ledge rock, boulders, and large stones shall be removed to provide four inches of soil cushion on each side of, and below all pipe and accessories. Blasting for excavation will be permitted only after the approval of the Engineer has been secured and only when proper precautions have been taken for the protection of persons and property. The Engineer shall fix the hours of blasting. The contractor at his expense shall repair any damage caused by blasting. The contractor's procedures and methods of blasting shall conform to state and local laws and to municipal ordinances.

All excavated material shall be stockpiled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept clear or other satisfactory provisions made for street drainage and natural watercourses shall not be obstructed.

.3.3 Proper implements, tools, and facilities satisfactory to the Engineer shall be utilized by the contractor for the safe and efficient execution of the work. All pipe, fittings, valves, hydrants and accessories shall be carefully lowered into the trench using suitable equipment in

such manner as to prevent damage to pipe and fittings. Under no circumstances shall the pipe or accessories be dropped or dumped into the trench.

The pipe and accessories shall be inspected for defects prior to lowering into trench. Any defective, damaged or unsound material shall be repaired or replaced as directed by the Engineer.

All foreign matter or dirt shall be removed from the interior of the pipe before lowering into position in the trench. Pipe shall be kept clean by means approved by the Engineer during and after laying.

The sealing surface of the pipe, the bell to be joined, and the elastomeric gaskets shall be cleaned immediately before assembly, and assembly shall be made as recommended by the manufacturer. When pipe laying is not in progress, the open ends of the installed pipe shall be closed to prevent entrance of trench water into the line. Whenever water is excluded from the interior of the pipe, enough backfill shall be placed on the pipe to prevent floating. Any pipe that has floated shall be removed from the trench and the bedding restored. No pipe shall be laid when the trench conditions or the weather are unsuitable for proper installation as determined by the Engineer.

The pipe shall be cut in a neat and workmanlike manner without damage to the pipe so as to have a smooth end at right angles to the axis of the pipe.

Valves, hydrants or fittings connected to PVC plastic pipe shall be equipped with bells having a profile that permits a seal to be made directly between the pipe end and the bell of the fitting with an elastomeric gasket. The elastomeric gasket shall be supplied by the fitting or accessory manufacturer.

Pipe ends shall be cut square, deburred and beveled in accordance with pipe manufacturer's recommendations.

The push on joint is a single elastomeric gasketed joint. It is assembled by positioning the elastomeric gasket in the annular groove of the bell and inserting the spigot end of the pipe into the bell. The spigot end of the pipe compresses the gasket radially to form a positive seal. The gasket and annular groove are designed, sized and shaped so that the gasket will resist displacement. Care shall be taken so that only the correct elastomeric gasket, compatible with the annular groove of the bell, is used. Insertion of the elastomeric gasket in the annular groove of the bell must be in accordance with the manufacturer's recommendations.

Hydrants conforming to AWWA C502, valves and fittings shall be provided and installed as shown on the drawings or as specified in the supplementary specifications. They shall be inspected and cleaned prior to installation.

A reaction or thrust blocking shall be provided at each hydrant, valve, bend, tee, and at reducers or fittings where changed in pipe diameters or directions occur. Anchorage may also be made to the water main pipe with rods and clamps. The size and shape of the thrust blocking or the number and details of anchor rods shall be as shown on the drawings or as specified in the supplementary specifications.

Plugs shall be inserted into the bells of all dead-end fittings. Spigot ends of accessories, fittings and plain ends of plastic pipe shall be capped. A reaction or thrust blocking shall be provided at all dead-ends of pipe that are capped or plugged. Capped or plugged outlets to fittings shall be restrained to the fittings, according to the fitting manufacturer's recommendations.

Service connections for all pipe diameters and classes may be made by means of a suitable saddle, tapped coupling, or service connector for plastic pipe. The saddle, tapped coupling, or service connector shall be installed according to the detailed plans and recommendations of the manufacturer thereof.

Approved service saddles shall be used with all taps. Threaded corporation stops shall be AWWA threaded stops. Non-threaded stops shall be rubber sleeved corporation stops. Tapping equipment used shall be standard water-works equipment using an AWWA threaded drill-tap tool designed for plastic pipe. Teflon tape shall be placed on the corporation stop threads prior to installation. Installation of corporation stops shall leave one to three threads visible. Stops shall not be torqued to more than thirty-five foot-pounds.

Mains shall be drained through drainage branches or blow offs to dry wells from which the water can be pumped. Drainage branches, blow offs, air vents and appurtenances shall be provided with valves and shall be located and installed as shown on the plans. Drainage branches or blow offs shall not be connected to any storm drain or sanitary sewer, submerged in any stream, or be installed in any other manner that will permit back siphonage into the distribution system.

All pipelines shall have a minimum 30" depth of cover.

Parallel Installation R.61-58.4 (D)(12)(a) (normal conditions):
Water mains shall be laid at least 10' horizontally from any sanitary sewer, storm sewer or sewer manhole, whenever possible. The distance shall be measured edge-to-edge.

Special conditions: When local conditions prevent a horizontal separation of 10', a water main may be laid closer to a storm or sanitary sewer provided that:

a) The bottom of the water main is at least 18" above the top of the sewer.
b) Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to water main standard of construction and shall be pressure tested to assure water tightness prior to backfilling.
c) The distances between the water main and sewer line and the joints of each shall be maximized.
d) Materials shall be used for the sewer line which meet the requirements of R.61-58.4(D)(1)
e) Enough distance shall be allowed to make repairs to one of the lines without damaging the other.

Crossing R.61-58.4(D)(12)(b) (normal conditions): Water mains crossing house sewers, storm sewers or sanitary sewers shall be laid to provide a separation of at least 18" between the bottom of the water main and the top of the sewer whenever possible.

(Unusual conditions): When local conditions prevent a vertical separation as described in "normal conditions" above, the following construction shall be used:

a) Sewers passing over or under water mains constructed of the materials described in "b" above.

b) In addition, Water mains passing under sewers shall be protected by providing:
A vertical separation of at least 18" between the bottom of the sewer and the top of the water main.

i) Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking the water mains;

ii) That the length of water pipe be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.

Sewer manholes: No water pipe shall pass through or come into contact with any part of a sewer manhole.

.3.4 Pressure and Leakage Tests in accordance with AWWA standard C600 Section 4, will be conducted after sufficient backfill has been placed to prevent lifting of the pipe. When local conditions require that the trenches be backfilled immediately after the pipe has been laid, the testing may be carried out after backfilling has been completed, but before placement of permanent surface.

At least seven days shall elapse after the last concrete thrust or reaction blocking has been cast with normal (Type I) Portland cement. This elapsed time may be reduced to three days with the use of a high early-strength (Type III) Portland cement.

The following procedure is based on the assumption that the pressure and leakage tests will be performed at the same time. Separate tests may be made if desired, however, if separate tests are made, the pressure test shall be made first. Each section of the pipeline shall be slowly filled with water and all air expelled by means of taps at high points. The specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The test pressure shall be maintained by additional pumping if necessary for the specified time during which the system and all exposed pipe, fittings, valves and hydrants shall be carefully examined for leakage. All defective elements shall be repaired or removed and replaced and the test repeated until all visible leakage has been stopped and the allowable leakage requirements have been met.

The contractor may perform simultaneous Pressure and Leakage Tests, or he may perform separate Pressure and Leakage Tests on the installed system at test durations and pressures specified.

The contractor shall furnish the gauges and measuring device for the leakage tests, pump, pipe, connections, and all other necessary apparatus, and shall furnish the necessary assistance to conduct the test. The duration of each leakage test shall be two hours unless otherwise specified, and during the test, the main shall be subjected to 150% of its working pressure, but not less than 150 psi. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, to maintain the specified leakage test pressure after the pipe has been filled with water and the air in the pipe line has been expelled. No installation will be accepted if the leakage is greater than that determined by the formula:

PVC: $L=[ND(P)1/2]/7400$

L is the allowable leakage, in gallons per hour. N is number of joints tested. D is the nominal diameter of the pipe in inches, and P is the average test pressure during the leakage test in pounds per square inch gauge. Pressure test duration shall be two (2) hours.

DIP: L=[SD(P)1/2]/133,200

L is the allowable leakage, in gallons per hour. S is length of pipeline tested in feet. D is the nominal diameter of the pipe in inches, and P is the average test pressure during the leakage test in pounds per square inch gauge. Pressure test duration shall be two (2) hours.

.3.5 Disinfection of all new water mains shall be conducted in accordance with C651, the AWWA Standard for Disinfecting Water Mains. Sterilization will be conducted and approved before any potable water main is placed in service. The complete line including fittings shall be flushed out and sterilized with chlorine or calcium hypochlorite. The sterilizing solution shall be introduced at one end of the main as water is being withdrawn from the other end in such proportion as to give 50 ppm of free chlorine throughout the main. The solution shall remain in the pipe for 24 hours at which time it shall have a residual chlorine of 25 ppm throughout the main or the process shall be repeated. Prior to sampling, the chlorine residual must be reduced to normal system levels or be non-detectable in those systems not chlorinating. During sampling, the chlorine residual must also be measured and reported.

The contractor shall collect a minimum of two (2) samples from each sampling site for total coliform analysis. The number of sites depends on the amount of new construction but must include all dead-end lines, be representative of the water in the newly constructed mains, and shall be collected a minimum of every 1200 linear feet.

If the membrane filter method of analysis is used for the coliform analysis, non-coliform growth must also be reported.

If the non-coliform growth is greater that eighty (80) colonies per one hundred (100) millimeters, the sample result is invalid and must be repeated.

Two (2) or more successive sets of samples, taken at 24 hour intervals and tested by a State approved private laboratory, shall indicate bacteriologically satisfactory water and these results submitted to the District Office.

.3.6 All pipe shall be laid on foundations prepared in accordance with the various classes of bedding required by the trench width and trench depth for the size of pipe to be laid as shown on the detail plans and specified as follows

1) Class A bedding shall be either a concrete anchor concrete cradle constructed in accordance with the methods shown on the detail plans. Concrete shall be Class B and shall be poured to the full width of the trench. Pipe shall be laid to line and grade on concrete blocking where the cradle method is used, after which the concrete shall be placed to the limits shown.
2) Class B bedding shall be either compacted, coarse granular material placed on a flat bottom trench, or a shaped trench bottom with a layer of compacted, fine, moist, granular material, constructed in accordance with the methods shown on the detail plans. The shaped bottom method may be used only where trenches are dry and suitable foundation and backfill material is available.

3) Alternate Class B bedding shall be undercut four (4) inches below the bottom of the pipe barrel, full width of the trench, and backfilled with compacted crushed stone, 3/4" and less or pea gravel with not less than 95% passing a 1/2-inch screen and 95% retained on a No. 4 screen. Stone or gravel shall be placed in layers of not more than 6-inches to the mid point the pipe. From the mid point of the pipe, backfilling shall continue in accordance with Section 806.3.2.

4) Class C bedding shall be either compacted, coarse, granular material placed on a flat bottom trench, or a shaped trench bottom with bell holes, constructed in accordance with the methods shown on the detail plans. The shaped bottom method may be used only where the trenches are dry and suitable foundation and backfill material is available.

5) Class D bedding, as shown on the detail plans, shall be a flat bottom trench with bell holes, and may be used only with the approval of the Engineer, for pipe sizes 6-inch to 12-inch inclusive, in dry trenches having suitable foundation and backfill material.

6) Bell holes shall be provided in all classes of bedding so as to relieve pipe tells of all load, but small enough to insure that support is provided throughout the length of the pipe barrel.

7) Stone or gravel bedding material specified herein shall be used where directed by the Engineer and shall consist of crushed stone or pea gravel, clean and graded, 95% to 100% of which shall pass a 1/2-inch sieve with 95% to 100% retained on a No. 4 sieve. Bedding material shall be placed on a flat bottom trench and thoroughly compacted by tamping or slicing with a flat blade shovel. Compacted bedding material shall be carried up the sides of the pipe to the heights shown on the detail plans for the various classes of bedding.

.3.7 All trenches and excavation shall be backfilled immediately after the pipes are laid therein, unless other protection of the pipeline is directed. The backfilling material shall be selected and deposited with special reference to the future safety of the pipes. Except where special methods of bedding and tamping are provided for, clean earth, sand or rock dust shall be solidly tamped about the pipe up to a level at least two (2) feet above the top of the pipes, and shall be carefully deposited in uniform layers, each layer solidly tamped or rammed with proper tools so as not to injure or disturb the pipe line. The remainder of the backfilling of the trench shall be carried on simultaneously on both sides of the pipes in such a manner that injurious side pressures do not occur.

After placing the backfill up to a level slightly below the natural ground surface, surplus excavation shall be windrowed and maintained in a suitable manner to concentrate and pond surface run-off from rains over the trench; after sufficient settlement has been obtained, in the opinion of the Engineer, the Contractor shall complete the dressing, removal of surplus materials and surface clean-up in accordance with these specifications.

All backfilling of excavated portions requiring pavement shall be mechanically tamped in 6-inch layers using heavy-duty tampers such as pneumatic jackhammers with tamping foot attachment. Each layer shall be thoroughly tamped to a density equivalent to at least 95% of an AASHO-T-99-49 Proctor Curve. Back-fill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones, other than crushed bedding, shall not come into contact with the pipe and shall not be within six (6) inches of the pipe. Settlement in trenches shall be refilled with crushed stone or gravel and such maintenance shall continue until the Engineer authorizes pavement.

Walking or working on the complete pipe sewer, except as may be necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a height of at least two (2) feet over the top of the pipes.

Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off, and finally made to conform to the surface of the ground. Backfilling shall be carefully performed and the original surface restored to the full satisfaction of the Engineer. Backfill in open trenches across sidewalks and in roadways shall be made as above specified, except that fill above pipes shall be deposited in layers not to exceed 6 inches and thoroughly compacted as provided elsewhere in these specifications. Surplus material shall be disposed of as directed by the Engineer.

331100.4 Additional Notes

.4 .1 All mains shall be detectable within three (3) feet with electronic locating equipment. Nonmetallic pipes shall be installed with copper wire or other means of detection.

.4 .2 Any pipe, solder, or flux which is used in the installation or repair of any public water system or in any plumbing in a residential or nonresidential facility which provides water, through connection to a public water system, for human consumption shall be lead free. Lead free is defined as not more than 0.2% lead with respect to solder and flux and not more than 8.0% lead with respect to pipes and pipefittings. Leaded joints necessary for the repair of cast iron pipes shall be exempt from the lead free requirement.

.4.3 All materials/products that contact potable water must be third party certified as meeting the specifications of ANSI/NSF Standard 61, Drinking Water System Components - Heath Effects.

.4.4 Natural rubber or other material which will support microbiological growth may not be used for any gaskets, O-rings, and other products used for jointing pipes, setting meters or valves, or other appurtenances which will expose the material to the water.

.4 .5 Lubricants which will support microbiological growth shall not be used for slip-on joints. Vegetable shortening shall not be used to lubricate joints.

.4 .6 Air relief valves shall be provided in accordance with sound engineering practices at high points in water mains as required. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur.

.4 .7 The open end of an air relief pipe from automatic valves or from a manually operated valve shall be extended to the top of the pit and provided with a screened downward facing elbow.

.4 .8 Chambers, pits or manholes containing valves, blow-off, meters, air release valves, or other such appurtenances to a distribution system, shall not be connected directly to any storm drain or sanitary sewer.

.4 .9 There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contamination materials may be discharged or drawn into the system.

.4 .10 Hydrant drains shall not be connected to or located within ten (10) feet of sanitary sewers.

331100.5 Clean Up

.5.1 Clean up shall be as specified in Section 890, Clean up, or by the Engineer.

SECTION 331216
GATE VALVES

331216.1 General

.1.1 Gate valves shall be iron-body, bronze-mounted, non-rising stem with either double-disc gates having parallel or inclined seats, or solid-wedge gates. Gate valves shall conform to AWWA C-500. All materials/products that contact potable water must be third party certified as meeting the specifications of ANSI/NSF Standard 61. The certifying party shall be accredited by the ANSI.

331216.2 Valve Pressure Ratings

.2.1 The design working water pressure shall be 200 psig for valves 12 inches in diameter and smaller, and 150 psig for valves with diameters of 16 inches and larger. Operating pressures for valves that fall outside these limits are beyond the scope of this standard and require special consideration in design and construction.

331216.3 Conditions and Materials Not Covered

.3.1 This section is not intended to cover special conditions of installation or operation such as built-in power drive, installation in vertical or steeply inclined lines, conveyance of water of unusual corrosivity, excessive water hammer, frequent operation as in filter service, or operation in a throttled position. Such conditions are beyond the intended scope of this standard and require special consideration in design and construction.

.3.2 Joint materials for end connections such as bolts, gaskets, glands, follower rings, etc., are not covered in this section.

331216.4 Data To Be Furnished By Manufacturer

.4.1 After purchase of the valve, the manufacturer shall, if requested, furnish catalog data, including illustrations, and a Parts Schedule giving the materials of which parts are made in sufficient detail to serve as a guide in the assembly and disassembly of the valve as well as in ordering repair parts.

.4.2 When required, the manufacturer shall furnish a statement of the total net assembled weight for each size of valve.

.4.3 When required for approval by the purchaser, the manufacturer shall submit one set of certified drawings showing the principal dimensions, construction details and materials used for all parts of the valve. All work shall be done and all valves shall be furnished in accordance with these certified drawings after they have been approved by the purchaser.

331216.5 Materials

.5.1 General -- All materials designated hereinafter, when used in valves produced under this section shall conform to the standards designated for each material listed. When reference is made to American Water Works Association (AWWA), American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), or other standards, it is understood that the latest revision thereof shall apply.

.5.2 Physical and Chemical Properties -- The requirements of AWWA, ANSI, ASTM, or other standards to which reference is made elsewhere in this document shall govern, the physical and chemical characteristics of the valve components.

NOTE: 14-inch and 18-inch diameter valves are not considered as standard size valves and are not covered by this section.

.5.3 Tests -- Whenever valve components are to be made in conformance with AWWA, ANSI, ASTM, or other standards that include test requirements or testing procedures, such requirements or procedures shall be complied with by the valve manufacturer. The records of all tests shall, if required by the purchaser, be made available to him.

.5.4 Cast Iron -- Cast iron shall equal or exceed the requirements of ASTM A-126, Class B.

.5.5 Bronze* -

Grade I	cast conforming to ASTM B-62
Grade II	cast conforming to ASTM B-132, (Alloy B)
Grade III	cast conforming to ASTM B-132 (Alloy B)
Grade IV	rolled conforming to ASTM B- alloy, (half-hard)
Grade V	shall be sufficiently malleable to conform to dovetailed grooves when penned or polled and shall have a minimum compressive strength, without permanent deformation of 4,000 psi
Grade VI	forged conforming to ASTM B-150 (any alloy)
Grade VII	omitted
Grade VIII	omitted
Grade IX	omitted
Grade X	Forged conforming to ASTM B-124 (alloy 2)
Grade XI	cast conforming to ASTM B143 (alloy)

.5.6 Steel -- Bolting materials shall conform to ASTM A-307, Grade B. Carbon-steel castings, when used, shall be ASTM A-27m Grade U60-30, or equal.

331216.6 General Design

.6.1 Resistance to Stress -- All parts of all valves shall be designed to withstand, without exceeding the fatigue limit of the material or being structurally damaged, (1) the stresses resulting from an internal test pressure of twice the rated design working water pressure of the valve, and (2) the combined stresses resulting from the full rated internal working pressure when the wedge or gates are moved across the seats, under full unbalanced working water pressure from the fully closed position to the point of opening, thence to complete closure.

.6.2 Basis of Structural Design -- All parts, including the body and bonnet, shall be so proportioned that, if excessive torque is applied to the stem in the closing direction with the valve disc seated and subjected to the working water pressure, failure of the pressure-retaining parts (such as the valve body or bonnet) shall not occur.

.6.3 Size of Waterway -- With the valve open, an unobstructed waterway shall be afforded, the diameter of which shall not be less than the full nominal diameter of the valve, except that, if lugs are provided for inserting or removing the body-seat rings, they need not be removed after the valve is assembled.

*Grades II, III, IV, and XI bronze shall not be used in waters that promote galvanic corrosion (that is, waters with pH higher than 9 or with a specific conductance of more than 350 umho/cm as determined in ASTM D-1125), as such waters will remove zinc from the bronze. In such waters, the bronze used shall not contain more than 16% zinc or more than 2% aluminum. Alternative materials shall be acceptable to the manufacturer and the purchaser, and shall meet the following physical limits:

BRONZE	MINIMUM TENSILE STRENGTH YIELD PSI	MINIMUM YIELD STRENGTH PSI	MINIMUM ELONGATION 2" PERCENT
Low Strength	30,000	14,000	20
Medium strength (stems for valves 24" and smaller)	40,000	20,000	15
High strength (stems for valves 30" & larger)	60,000	32,000	10

331216.7 Bodies and Bonnets

.7.1 Shell thickness measurements taken at points diametrically opposite to each other shall, when added together and divided by 2, equal or exceed the minimum metal thickness given in Table 1. Shell thickness at no point shall be more than 12.5% below the minimum metal

thickness called for in Table 1, and no continuous area of deficient thickness shall exceed 12.5% of the pressure-containing shell area of the casting.

.7.2 All metal sections and ribbing shall be properly proportioned and corners shall have well-rounded fillets in accordance with good foundry practice. In double-disc gate valves, the body and bonnet shall be designed to reduce side clearance of the discs.

.7.3 The valve body shall be machined and threaded for shoulder-seated (or bottom-seated) body-seat rings, and the thread shall be sufficiently deep and the seating surface sufficiently accurate to prevent leakage behind the body-seat rings.

.7.4 The thrust-bearing recess and the stem opening (if the latter is in contact with the stem) in the bonnet shall have a smooth, machined finish. In valves 16" in diameter and larger, the thrust-bearing surface shall be Grade I or II bronze and the stem opening shall be Grade I or II bronze bushed if the latter is in contact with the stem.

.7.5 In horizontal-stem valves 16 inches in diameter and larger and in vertical-stem valves 24" in diameter and larger, a pair of accurately matched dowel holes and tapered or round-end dowels shall be provided in the flanges of the body and bonnet to aid in assembling. Dowels shall be located at opposite ends of the flange-one near the lateral centerline and the other approximately 2" from the lateral centerline.

.7.6 Bodies and bonnets of valves shall be made of cast iron of not less than Class-B material as specified in ASTM A-126. The manufacturer may use ductile iron for valve bodies and bonnets to comply with the requirements of Section 33 12 16.6.1 and 33 12 16.6.2 instead of cast iron, provided the thickness comply with those in Table 1.

TABLE 1
Minimum Thickness of Bodies and Bonnets

Valve Diameter in.	Minimum Thickness* in.
3	0.37 (3/8)
4	0.40 (13/32)
6	0.43 (7/16)
8	0.50 (1/2)
10	0.63 (5/8)
12	0.68 (11/16)
16	0.85 (27/32)
20	0.97 (31/32)
24	1.08 (1 5/64)
30	1.39 (1 13/32)
36	1.54 (1 17/32)
42	1.58 (1 19/32)
48	1.73 (1 23/32)

The decimal value should be used when the two expressions are not exactly equivalent.

331216.8 Bonnet Bolting

.8.1 Bolting materials shall develop the physical strength requirements of ASTM A-307, Grade B, or may have either regular square or hexagonal heads with dimensions conforming to American National Standard for Square or Hexagonal Bolts and Screws (ANSI B18.2.1). Bolts, studs, and nuts shall be (1) cadmium plated (ASTM A265, Grade N.S.) or zinc-coated (ASTM A153 or A164, Type G.S.), or (2) rust proofed by some other process (such as parkerizing or shreadizing) disclosed to and acceptable to the purchaser. The purchaser may specify that bolts, studs, and nuts shall be made from a corrosion-resistant material such as low-zinc bronze, monel, or stainless steel.

331216.9 Valve Ends

.9.1 Bell Ends for Caulked Joints -- The dimensions of the bell on valves up to and including 12" in size shall conform to those for bell-and-spigot fittings specified in AWWA C110 (ANSI A21.10).

.9.2 On valves 16" and larger in size, the bell dimensions shall conform to those for bell-and-spigot fittings specified in AWWA C110 (ANSI A21.10) except for the bell diameters.

.9.3 On valves 3" through 24" in size, the inside diameter shall be as shown in Table 2.

.9.4 On valves 30" and larger in size, the inside bell diameter of the valve or the outside diameter of the pipe to be used shall be specified in the purchaser's supplementary specifications if deviating from Table 2.

.9.5 Flanged Ends -- The end flanges of flanged gate valves shall conform in dimensions and drilling to ANSI B16.1 for Cast-Iron Flanges and Flanged Fittings, 125 lbs., unless explicitly provided otherwise in the supplementary specifications. Unless spotfacing is required by supplementary specifications, the bolt holes of the end flanges shall not be spotfaced except when the thickness at any point within the spotface area, as defined in Manufacturers Standardization Society Standard Practice MSS SP-9, exceeds the required minimum thickness by more than the following amounts:

Nominal Valve Size Inches	Excess Thickness (minimum) Inches
2 - 12	1/8
14 - 24	3/16
30 - 48	1/4

If the foregoing limits are exceeded, either spotfacing or backfacing may be used to

meet these requirements. When required, all spotfacing shall be done in accordance with MSS SP-9.

.9.6 Mechanical-Joint Ends -- Mechanical-joint bell dimensions shall conform to AWWA C111 (ANSI A21.11). Slots, with the same width as the diameter of the boltholes, may be provided instead of holes in the bell flange only at those places where the valve body and bonnet interfere with the joint assembly.

TABLE 2

Valve Diameter (in.)	ID of Bell* (in.)
3	4.66
4	5.70
6	7.80
8	10.00
10	12.10
12	14.20
16	18.80
20	23.06
24	27.32
30	33.74
36	40.16
42	46.58
48	52.98

*The listed dimensions for 30" through 48" sizes are the same as those formerly specified for Class-D cast-iron pressure fittings.

331216.10 Gates and Rings

.10.1 To preclude loosening or leaking behind the seats, cast-iron gates shall be fitted with separate rings that have a cross section stiff enough to resist accidental deformation in handling and assembly.

.10.2 Gate rings shall be rolled, peened, or pressed into grooves machined in the discs or fastened by some other method disclosed to, and acceptable to the purchaser.

.10.3 Smooth, machine-finished cuts shall be taken over the gate rings after they have been fully secured in place.

.10.4 The width of the face of the gate rings shall not be less than that of the body-seat rings, and there shall be provided a sufficiently greater width to permit the gates to continue to

seat tightly after allowance for reasonable wear of the faces of the rings, and of the various parts of the mechanism of the gate.

.10.5 Valve gates shall be cast iron or Grade I bronze at the manufacturer's option unless bronze is explicitly required by the purchaser's supplementary specifications. Gate rings shall be made of Grade V bronze.

331216.11 Body-Seat Rings

.11.1 Body-seat rings shall be back faced, with threads accurately cut, and the rings shall be screwed into machined seats in the body, the face in contact with the gate-seat ring shall be smooth and machine-finished. The rings shall be made with a cross section stiff enough to resist accidental deformation in handling and assembly.

.11.2 The width of body-seat rings shall be sufficient to result in a bearing pressure of the gate on the body-seat ring of not more than 2,000 psi under a hydrostatic pressure of 300 psi. The thickness of the body-seat ring shall be not less than 20% of the width of the face as calculated from the above requirement.

.11.3 Body-seat rings shall be made of Grade I bronze.

331216.12 Wedging Devices

.12.1 Gate valves of the double-disc type shall be equipped with a free and positive-operating internal wedging device, simple and rugged in design, which will, in closing the valve when the discs cover the ports, press them firmly against the body seats and, in the opening direction, release the wedging load therefrom before both discs start to move.

.12.2 Bronze used for wedges shall be Grade I, II, or III. Pins and bolts in the wedging mechanism of all valves shall be Grade IV bronze. In valves 16" in diameter and larger, all wedging surfaces shall be Grade I, II, or III bronze to bronze; in valves with diameters of 3" - 12" inclusive, all wedging surfaces may be Grade I, II, or III bronze to iron, but not iron to iron. At the manufacturer's option, copper-nickel alloy, monel made to ASTM B-149, or 300 series stainless steel to iron may be used. At the manufacturer's option, copper-nickel alloy or monel, ASTM B-149 may be used for wedging surfaces instead of Grade I bronze.

331216.13 Guides (Solid-Wedge Gate Valves)

.13.1 In solid-wedge gate valves, tongue-and-groove guides shall be provided on the sides of the gate and in the body to keep the gate centered between the seats throughout its length of travel.

.13.2 In valves 16" in diameter and larger, bearing surfaces between the gates and the guides, shall each have a length equal to at least 50% of the port diameter of the valves, and the guide contacts shall be Grade I, II, III, or IV bronze to bronze.

331216.14 Rollers and Tracks for Horizontal Valves

.14.1 Double-Disc Valves -- Gate valves of the double-disc type, 16" in diameter and larger, designed to lie horizontally in a horizontal pipe line, shall be equipped with solid bronze (Grade I or IV) or 300 series stainless steel tracks securely fastened in body and bonnet. The weight of the gates shall be carried on rollers throughout their entire length of travel.

.14.2 In double-disc gate valves of the rolling-disc type, the discs shall serve as rollers.

.14.3 In double-disc valves of other than the rolling-disc type, the discs shall be carried on solid-bronze (Grade I, II, III, or IV) rollers securely attached to them.

.14.4 In all valves in which rollers and tracks are used, bronze scrapers (Grade I, II, III or IV) shall be provided to traverse the tracks ahead of the rollers in both directions of travel to remove any foreign matter accumulated on the track.

331216.15 Stems and Stem Nuts

.15.1 All stem collars shall be made integral with stems.

.15.2 The threads of stems and stem nuts (disc bushings) shall be of Acme, modified Acme, or one-half V-type, with a sufficient number of cuts to avoid straining the metal.

.15.3 Stems shall be turned and threaded straight and true, and shall work true and smooth and in perfect line throughout the lift of opening and thrust of closing the valve.

.15.4 The diameter of the stem at the base of the thread, or at any point below that portion shaped to receive the wrench nut or gear, shall be no less than that specified in Table 3.

.15.5 Stems in valves up to and including 16 inches in diameter shall have a lead of not more than 1/3". Stems in valves 20" and larger shall have a lead of no more than 1/2". (See Table 3 for minimum number of turns to open).

.15.6 Valve stems shall be cast, forged, or rolled bronze. Bronze for cast stems shall be Grade II, III, or IV, or medium-strength low-zinc, low-aluminum bronze for valves sizes 24" and smaller, and Grade III or IV, or high-strength, low-zinc, low-aluminum bronze for valves size 30" and larger. Bronze for forged and rolled stems shall be Grace II, IV, VI, or XI with physical characteristics equal to or better than shown in Table 4. Stem nuts shall be Grade I, II, or III bronze.

.15.7 Valve stems and parts of some grades and manganese bronze, together with some other materials, are subject to stress corrosion. If stems and parts are to be highly stressed under test or operating conditions, the manufacturer shall design the valve and select materials to minimize stress-corrosion. If design changes are required, they shall comply with or exceed the requirements of this standard.

331216.16 Stem Seal

.16.1 Design of the stuffing box shall be such that the valve can be packed under pressure when in the fully open position.

.16.2 The stem opening, thrust-bearing recess, and bonnet face of the stuffing box shall be smooth, machine-finished. In valves 16" in diameter and larger, both the stem opening and thrust-bearing recess shall be bronze-bushed.

.16.3 Stuffing boxes shall have a depth not less than the diameter of the valve stem. The internal diameter shall be large enough to contain adequate packing to prevent leakage around the stem.

.16.4 When an o-ring or other pressure-actuated stem seal is used, the design shall incorporate two such seals, the dimensions of such seals to be in accordance with Military Specification MIL-P-5514.

.16.5 The o-ring stem seal shall be so designed that the seal above the stem collar can be replaced with the valve under pressure in the full-open position.

.16.6 The stuffing box shall be made of cast iron. Thrust surfaces and stem openings, if bushed, shall be bronze. Stem seal bolts and nuts shall conform to the requirements as specified in Section 826.8.

331216.17 Packing

.17.1 Material -- Stuffing box packing shall be made of asbestos, conforming to Federal Specification HH-P-34c, Type A, or flax packing conforming to Federal Specification HH-P-106d. At the manufacturer's option, TFE-impregnated asbestos may be used. Hemp or jute packing shall not be used.

.17.2 Installation -- Stuffing boxes shall be properly packed and ready for service when valves are delivered to the purchaser.

TABLE 3
Minimum Diameter of Stem and Minimum Number of Turns to Open

Valve Diameter (in.)	Minimum Diameter of Stem (at Base of Thread - in.)	Minimum No. of Turns to Open
3	0.594	9
4	0.8594	12
6	1.000	18
8	1.000	24
10	1.125	30
12	1.188	36
16	1.433	48
20	1.750	40
24	1.969	48
30	2.183	60
36	2.50	72
42	2.75	84
48	3.50	96

TABLE 4
Physical Characteristics of Manganese Bronze*

	Minimum Tensile Strength (psi)	Min. Yield Strength (psi)	Min. Elongation in 2" %
Valve sizes 24"and smaller	60,000	20,000	15
Valve sizes 30" and larger	80,000	32,000	15

*For use in forged and rolled stems.

331216.18 Glands and Gland Bolts and Nuts

.18.1 The gland assembly shall be of solid, solid- or two-piece design. Gland flanges (followers) may be formed as a flanged end on the gland, or as a separate part.

.18.2 Glands for valves of sizes 12" and smaller shall be made of Grade I, II, III, IV, or X bronze. Glands for valves of sizes larger than 12" may be made of iron with bushings of Grade I, II, III, IV, or X bronze. Glands that are either (1) cadmium-plated or zinc-coated (ASTM A-123) or, (2) rust proofed by some other process, such as parkerizing or sherardizing disclosed to and acceptable to he purchaser, may be furnished.

.18.3 If a gland flange (follower) is used; it shall be made of either cast iron or bronze of a corresponding grade of material specified in Section 33 12 16.18.2 for glands.

.18.4 Gland bolts shall be made either of Grade II or IV bronze or rustproofed steel according to Section 33 12 16.8. Gland bolt nuts shall be made of Grade II, III, or IV bronze.

331216.22 Indicators

.22.1 When required by the purchaser's supplementary specifications, geared valves shall be equipped with indicators to show the position of the gate in relation to the ports. The indicator mechanism shall be all bronze, enclosed in a dirt proof, cast-iron case, and mounted in such a position that the man operating the valve can easily see the indicator.

331216.23 Bypasses

.23.1 Bypasses, when required by the purchaser's supplementary specifications, shall be of the sizes shown in Table 6. Bypass valves shall be of the same size as the bypass and shall conform to the requirements of this standard for the specific size used.

331216.24 Gaskets

.24.1 Gaskets shall be full cut, with holes to pass bolts or cut to fit inside of bolts and shall be used on all flanged joints intended to be watertight.

.24.2 Gasket material shall be either asbestos, a rubber composition, or paper free from corrosion ingredients, either alkaline or acid.

331216.25 Workmanship

.25.1 All workmanship employed in the fabrication and assembly of valves covered by this standard shall be first class in every respect. Valve parts shall be designed, and manufacturing tolerances set, to provide interchangeability in the products any one manufacturer between units of the same size and type, except for the individual fit of the wedge in the body. When assembled, valves manufactured in accordance with this standard shall be well fitted and smooth operating.

.25.2 All castings shall be clean and sound, without defects that will impair their service. No plugging, welding, or repairing of such defects will be allowed.

331216.26 Painting

.26.1 An asphalt varnish, made to comply with Federal Specification TT-V-51e or MIL-C-450b, shall be applied to the ferrous parts of the valves, except for finished or bearing surfaces. Surfaces shall be clean, dry, and free from rust and grease before

painting. Two coats shall be applied to both the inside and outside ferrous metal.

Table 6
Size Requirements of Bypasses

Valve Diameter Inches	Bypass Diameter Inches
16 - 20	3
24 - 30	4
36 - 42	6
48	8

331216.19 Wrench Nuts

.19.1 Wrench nuts shall be fitted to the top of the valve stem, and secured in position by nut, pin, or key.

.19.2 Unless otherwise explicitly required by the purchaser's supplementary specifications, the wrench nuts shall be 1-15/16 inch square at the top, 2 inches square at the base, and 1-3/4 inches high. Nuts shall have a flanged base upon which shall be cast an arrow at least 2 inches long showing the direction of the opening, and the word "OPEN", in 1/2" or larger letters shall be cast on the nut to indicate clearly the direction to turn the wrench when opening the valve.

.19.3 The flanged base of the nut may be shaped or cut away to permit access from the ground surface to the packing gland bolts with an extension socket wrench.

.19.4 Wrench nuts shall be made of cast iron.

331216.20 Gearing

.20.1 Gears, if they are required by the purchaser's supplementary specifications, shall be accurately formed and smooth running, with bronze pinion shaft operating in bronze or permanently sealed anti-friction bearings. Gear teeth shall be machine cut.
Gear ratios shall not be less than those shown in Table 5.

.20.2 Geared valves shall be equipped with cut-tooth steel gears unless cut-tooth cast-iron gears are explicitly required by the purchaser's supplementary specifications. Pinions with cast-iron gears shall be steel. Material for steel gears shall be ASTM A-27, Grade U60-30.

331216.21 Gear Cases

.21.1 When geared valves are furnished, enclosed gear cases are required unless definitely excluded by the purchaser's supplementary requirements. Two types may be furnished: the extended type or the totally enclosed type. The extended type shall be attached to the bonnet of the valve in such a manner as to permit repacking of the stuffing box of the valve

without detaching the gear case. The totally enclosed type shall enclose both stuffing box and gearing.

Table 5
Gear Ratios

Valve Diameter Inches	Gear Ratio
16	2:1
20	2:1
24	2:1
30	3:1
36	3:1
42	4:1
48	4:1

331216.27 Marking

.27.1 Markings shall be cast on the bonnet or body of each valve, and shall show the manufacturer's name or mark, the year the valve casting was made, the size of the valve, and the designation of working water pressure -- "150W" for 16-48" valves, and "200W" for 3" - 12" valves. Special markings in addition to these can be supplied when specified by the purchaser's supplementary requirements, upon agreement between purchaser and manufacturer.

331216.28 Testing

.28.1 After manufacture, each gate valve shall be submitted to operation and hydrostatic tests at the manufacturer's plant as specified in this section.

.28.2 Operation Test -- Each valve shall be operated in the position for which it was designed to ensure free and perfect functioning of all parts in the intended manner. Any defects of workmanship shall be corrected and the test repeated until satisfactory performance is demonstrated.

.28.3 Hydrostatic Tests -- Each valve shall be subjected to hydrostatic test. For double-disc gate valves, a hydrostatic test pressure equal to twice the rated working pressure of the valve shall be applied between the discs. This test shall show no leakage through the metal or flange joints. Subsequently, a test shall be made at the rated working pressure, applied between the discs. This second test shall show no leakage through the metal or at flange joints, and the leakage past either seat shall not exceed a rate of one (1) fl. oz/hr per inch of nominal valve size.

For solid-wedge gate valves, a hydrostatic pressure equal to twice the rated working pressure of the valve shall be applied with both ends bullheaded and the gate open. This test shall show no leakage through the metal or flange joints. Subsequently, a test shall be made at the rated working pressure, applied (through bulkheads) alternately to each side of the closed gate with the opposite side open for inspection. This second test shall show no leakage through

the metal or at flange joints, and the leakage past either seat shall not exceed a rate of one (1) fl. oz/hr. per inch of nominal valve size.

331216.29 Inspection and Rejection

.29.1 All work under this standard shall be subject to inspection and approval by the purchaser's duly authorized engineer or inspector who shall, at the time, have access to all places of manufacture where materials are being produced or fabricated, or tests are being conducted, and who shall be accorded full facilities for inspection and observation of tests. Any gate valve or part that he may condemn as not conforming to the requirements of this standard shall be made satisfactory or shall be rejected and replaced at the manufacturer's expense.

331216.30 Affidavit of Compliance

.30.1 Whether the purchaser has an inspector at the plant or not, he may require an affidavit from the manufacturer or vendor that the valves furnished under the purchaser's order comply with all applicable provisions of this standard.

331216.31 Preparation for Shipment

.31.1 Valves shall be complete in all details when shipped. The manufacturer shall use care in preparing them for shipment so that no damage due to the manufacturer's negligence will occur in handling or in transit. Valves must be drained and completely closed before shipment.

.31.2 Valves 24" in diameter and larger shall be securely bolted or otherwise fastened to skids in such a manner that they may be safely unloaded with a crane.

SECTION 333000
PVC SEWER SERVICES

333000.1 General

.l.l PVC Sewer Pipe shall be of type, size, class, and diameter as herein after specified and called for by the plans and/or bid form.

333000.2 Material

.2.1 PVC Sewer Service pipe shall be as specified by ASTM D3034, with an SDR of 35.

.2.2 the pipe shall be made of PVC plastic having a cell classification of 12454-B or 12454-C as defined in ASTM specification D1784.

.2.3 Clean rework material, generated from the manufacturer's own pipe or fittings production may be used by the same manufacturer provided that the pipe or fittings produced meet all the requirements of this standard.

.2.4 Joints shall be bell and spigot and conform to ASTM D3034 Section 6. In case of doubt or conflict as to compliance of joining systems, manufacturer's data should be submitted to the Engineer for approval.

333000.3 Installation

.3.1 Installation shall be as specified in PVC Sewer Mains, Section 701.3.

.3.2 All sewer services shall be referenced to the station numbers given on the plans and a list or sketch of such references shall be submitted to the Engineer after service installation is complete. All sewer services shall be marked with a wooden or iron stake at the time of installation.

333000.4 Inspection and Acceptance

.4.1 Sewer services shall be in place when infiltration tests as specified in Section 33 31 00.4 are conducted. The Engineer may require up to 5% of the total number of sewer services to be excavated by the contractor to spot check location and construction. If deficiencies are found in these excavated services, the owner reserves the right to require excavation of the remainder for inspection.

333000.5 Clean Up

.5.l Clean up shall be as specified in Section 01 74 01, Clean Up, or by the Engineer.

SECTION 333100
PVC SEWER LINES

333100.1 General

.1.1 Pipe shall be of type, size, class and diameter as hereinafter specified and called for by the plans and/or bid form. Nominal laying lengths may also be specified herein or by the Engineer as conditions warrant.

333100.2 Material

.2.1 PVC Sewer Pipe shall be as specified by ASTM D3034, with an SDR of 35.

.2.2 the pipe shall be made of PVC plastic having a cell classification of 12454-B or 12454-C as defined in ASTM specification D1784.

.2.3 Clean rework material, generated from the manufacturer's own pipe or fittings production may be used by the same manufacturer provided that the pipe or fittings produced meet all the requirements of this standard.

.2.4 Joints shall conform to ASTM D3034 Section 6. In case of doubt or conflict as to compliance of joining systems, manufacturer's data should be submitted to the Engineer for approval.

333100.3 Installation

.3.1 PVC Sewer Pipe shall be laid in conformance with ASTM D2321. Contractor shall haul pipe and appurtenances to the work site and distribute them neatly along the trench prior to lying. Pipe shall be carefully handled to prevent damage by using mechanical hoists or other approved methods. All damaged pipe and appurtenances shall be rejected and removed from the work site.

(1) Pipe and appurtenances shall be kept clean and open ends securely plugged when pipe lying is not in progress. Inside of pipe, bells and spigots shall be thoroughly inspected and cleaned prior to lowering into ditch, and care shall be exercised after pipe is in place to prevent dirt or other extraneous material from getting into pipe, bells and spigot.

(2) Spigots shall be fully seated in bells, and pipe shall be uniformly bedded on bottom of trench for its entire length with bells lying in previously dug bell holes sufficiently large to allow proper bedding and jointing. Pipe shall be cut where necessary.

(3) Each section of pipe shall be laid to the specified line and grade, working in the upstream direction.

(4) All sewer lines shall be laid with a 10-foot horizontal or 18-inch vertical separation from any existing or proposed potable water lines per GLUMRB "Recommended Standards in Sewage Works", Section 29.3.

.3.2 The Contractor shall perform all excavation of every description and of whatever substance encountered in the depth shown on the plans or specified for all mains, manholes, and other appurtenances.

The top portion of trenches may be excavated with sloping or vertical sides to any width, which will not cause damage to adjoining structures, roadways, pavements, utilities or private property. For untimbered trenches or trenches held by stay bracing only, the width of the lower portion of the trench to a height of two feet above the top of the pipe shall not exceed the pipe diameter plus 18 inches unless otherwise specified in the plans. The width of trenches where skeleton or solid sheeting is used may be increased to dimensions approved by the Engineer, but not greater than necessary to clear the whalers when lowering pipes into the trench.

If the trenches are excavated to widths in excess of the above limitations, or collapse because of insufficient bracing and sheeting, the Contractor will be required to use special methods of constructing pipe foundations and backfilling and specified herein at his own expense.

The bottom of all trenches, except as otherwise specified shall be rounded to conform to the bottom of the pipe so as to afford full bearing on the pipe barrel. The Engineer shall direct the depth and width required for such shaping.

Excavation in excess of depth required for proper shaping shall be corrected by one of the special methods specified herein, as ordered by the Engineer. Bell holes shall be excavated so as to relieve pipe bells of all loads, but small enough to insure that support is provided throughout the length of the pipe barrel.

.3.3 All pipe shall be laid on foundations prepared in accordance with the various classes of bedding required by the trench width and trench depth for the size of pipe to be laid, as shown on the detailed plans and specified as follows:

(1) Class "A" bedding shall be either a concrete arch or concrete cradle constructed in accordance with the methods shown on the detail plans. Concrete shall be 2500-PSI minimum and shall be poured to the full width of the trench. Pipe shall be laid to line and grade on concrete blocking where the cradle method is used, after which the concrete shall be placed to the limits shown.

(2) Class "B" bedding shall be either a compacted, coarse granular material placed on a flat bottom trench, or a shaped trench bottom with a layer of compacted, fine moist, granular material, constructed in accordance with the methods shown on the detail plans. The shaped bottom method may be used only where trenches are dry and suitable foundation and backfill material is available. Coarse granular material shall meet the S.C.D.H.& P.T. requirement designated Aggregate #57.

(3) Alternate Class "B" bedding shall be undercut four (4) inches below the bottom of the pipe barrel, full width of the trench, and backfilled with compacted crushed stone, 3/4" and less

or pea gravel with not less than 95% passing a 1/2-inch screen and 95% retained on a No. 4 screen. Stone or gravel shall be placed in layers of not more than 6-inches to the mid point of the pipe. From the mid point of the pipe, backfilling shall continue in accordance with Section 701.3.4. Crushed stone shall meet the S.C.D.H.& P.T. requirement designated Aggregate #57.

(4) Class "C" bedding shall be either a compacted, coarse, granular material placed on a flat bottom trench, or a shaped trench bottom with bell holes, constructed in accordance with the methods shown on the detail plans. The shaped bottom method may be used only where the trenches are dry and suitable foundation and backfill material is available.

(5) Class "D" bedding, as shown on the detail plans, shall be a flat bottom trench with bell holes, and may be used only with the approval of the Engineer, for pipe sizes 6-inch to 12-inch inclusive, in dry trenches having suitable foundation and back-fill material.

(6) Bell holes shall be provided in all classes of bedding so as to relieve pipe bells of all loads, but small enough to insure that support is provided throughout the length of the pipe barrel.

(7) Stone or gravel bedding material specified herein shall be used where directed by the Engineer and shall consist of crushed stone or pea gravel, clean and graded, 95% to 100% of which shall pass a 1/2-inch sieve with 95% to 100% retained on a No.4 sieve. Bedding material shall be placed on a flat bottom trench and thoroughly compacted by tamping or slicing with a flat blade shovel. Compacted bedding material shall be carried up the sides of the pipe to the heights shown on the detail plans for the various classes of bedding.

.3.4 All trenches and excavation shall be backfilled immediately after the pipes are laid therein, unless other protection of the pipeline is directed. The backfilling material shall be selected and deposited with special reference to the future safety of the pipes. Except where special methods of bedding and tamping are provided for, clean earth, sand or rock dust shall be solidly tamped about the pipe up to a level at least two (2) feet above the top of the pipes, and shall be carefully deposited in uniform layers, each layer solidly tamped or rammed with proper tools so as not to injure or disturb the pipe line. The remainder of the backfilling of the trench shall be carried on simultaneously on both sides of the pipes in such a manner that injurious side pressures do not occur.

After placing the backfill up to a level slightly below the natural ground surface, surplus excavation shall be windrowed and maintained in a suitable manner to concentrate and pond surface run-off from rains over the trench; after sufficient settlement has been obtained, in the opinion of the Engineer, the Contractor shall complete the dressing, removal of surplus materials and surface clean-up in accordance with these specifications.

All backfilling of excavated portions requiring pavement shall be mechanically tamped in 6-inch layers using heavy-duty tampers such as pneumatic jackhammers with tamping foot attachment. Each layer shall be thoroughly tamped to a density equivalent to at least 95% of an AASHO-T-99-49 Proctor Curve. Settlement in trenches shall be refilled with crushed stone or gravel and such maintenance shall continue until the Engineer authorizes pavement.

Walking or working on the complete pipe sewer, except as may be necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a height of at least two (2) feet over the top of the pipes.

Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off and finally made to conform to the surface of the ground. Backfilling shall be carefully performed and the original surface restored to the full satisfaction of the Engineer. Backfill in open trenches across sidewalks and in roadways shall be made as above specified, except that fill above pipes shall be deposited in layers not to exceed 6 inches and thoroughly compacted as provided elsewhere in these specifications. Surplus material shall be disposed of as directed by the Engineer.

333100.4 Inspection and Acceptance

.4.1 Before sewer lines are accepted; all such lines shall be tested and cleaned to the satisfaction of the Engineer.

.4.2 Deflection Testing shall be performed by the Contractor in the presence of the Engineer. All gravity lines will be tested after consolidation of trench backfill has taken place. The Contractor will furnish 5% mandrills for use in testing.

.4.3 Infiltration leakage test shall be required and shall be conducted only when the ground water table is above the top of the sewer pipe and after all visible leaks have been stopped. Waiting would occasion when the ground water table is below the top of the sewer and serious delays for a high ground water table, then leakage shall be determined by exfiltration tests. Tests shall be made on the total line or lines but in sections of such lengths as determined by the Engineer. The Contractor shall furnish all tests plugs, water, and labor as necessary. The maximum permissible leakage rate in either case shall be 200 U.S, gallons per inch nominal diameter per mile per day. Leakage tests shall be conducted after all manholes, services, and other appurtenances are installed.

.4.4 Air testing, when required, will be in accordance with ANSI,C828-75T. Air testing will be required where the Engineer deems the ground water table to be too low for infiltration testing, or as a supplement to infiltration testing.

333100.5 Clean Up

5.1 Clean up shall be as specified in Section 890, Clean Up, or by the Engineer.

SECTION 334100
CONCRETE STORM DRAINAGE PIPE

334100.1 General

334100.1.1 Pipe shall be type; size, class and diameter as hereinafter specified and called for by the plans and/or bid form. Unless otherwise noted, pipe shall be circular and furnished in laying lengths of 4 to 8 feet.

334100.2 Material

334100.2.1 Reinforced Concrete Pipe shall meet requirements of ASTM C-76. Where a strength class is not specified, Class III pipe shall be used.

1) Joints shall be mortar joints consisting of a mixture of one part Portland cement and two parts of clean sand by volume. Water content shall be as low as practical with a maximum of 5-1/2 gallons of water per sack of cement.

2) Concrete pipe tees and elbows shall conform to all applicable requirements for AASHO M-170 for the class of pipe tee or elbow specified.

334100.2.2 Catch basin and manhole material shall consist of brick, precast or cast-in-place concrete, in accordance with the following requirements. All material shall be approved by the Engineer prior to use.

1) Brick shall be concrete brick meeting ASTM Specification C55, Grade A, or No. 2 common hard clay or shale. All bricks shall be free from cracks and defects that would impair their strength or usefulness.

2) Precast concrete catch basins and manholes shall conform to ASTM C478 and shall consist of precast reinforced concrete riser sections, a monolithic base section and a conical or flat slab top section as required -- all in accordance with the details shown on the drawings. Minimum compressive strength of concrete shall be 8 percent of the dry mass. Pipe openings shall be provided in base sections and riser sections as required, and shall be of suitable size to fit the pipe. Lifting holes may be provided in each section for ease of handling.

3) Joint material shall consist of mortar for brick and block structures. Jointing for precast structures may be mortar, plastic gasket sealant, or rubber gasket.

334100.2.3 Castings and steps shall be provided for each catch basin and manhole. Catch basin and manhole covers, frames, grates and steps shall conform to the details for each type catch basin and manhole on the drawings, or to similar plans differing in detail but of equally good design, provided such castings are approved by the Engineer prior to use. Covers, grates,

and frames shall be machined to provide plane, smooth surfaces for uniform seating and interchangeability of covers. Rings and covers that provide imperfect seating will be rejected.

(1) Castings shall be of cast iron of superior quality, tough and even texture, and of not less than 40% pig. They shall be clear of blowholes, and holes, cracks or other defects, properly finished and bituminous coated while hot.

334100.2.4 Masonry cement shall be of the best grade, conforming to ASTM Specification C91, Type II, of a brand approved by the Engineer. It shall be newly manufactured, well housed, kept dry and protected at all times.

334100.2.5 Crushed stone for foundation shall conform to ASTM C33, size No. 67, with the size range of 1/4 inch to 3/4 inch.

334100.3 Clearing

334100.3.1 Clearing along pipelines shall be done prior to pipe installation.

(1) If required, clearing of trees and brush along pipelines shall be carefully done so that no damage will occur outside of right-of-way limits. Trees and brush shall be cut by hand and trees felled within right-of-way limits. Only trees that will seriously interfere with construction shall be cut down and all others shall be saved and protected. Trees 6 inches or more in diameter shall be trimmed into usable lengths not over 16 feet long, and logs neatly stacked on edge of right-of-way in accessible locations for owner's use. Brush and laps shall be taken away for burning or disposal as required by the Engineer.

334100.4 Installation

334100.4.1 Pipe -- Contractor shall haul pipe and appurtenances to the work site and distribute them neatly along the trench prior to laying. Pipe shall be carefully handled to prevent damage by using mechanical hoists or other approved methods. All damaged pipe and appurtenances shall be rejected and removed from the work site.

The contractor shall perform all excavation of every description and of whatever substance encountered in the depth shown on the plans or specified for all pipe, appurtenances, and structures.

The top portion of trenches may be excavated with sloping or vertical sides to any width that will not cause damage to adjoining structures, roadways, pavements, utilities or private property. For untimbered trenches or trenches held by stay bracing only, the width of the lower portion of the trench to a height of two feet above the top of the pipe shall not exceed the pipe diameter plus two feet unless otherwise specified in the plans. The width of trenches where skeleton or solid sheeting is used may be increased to dimensions approved by the Engineer, but not greater than necessary to clear the whalers when lowering pipe into the trench.

If the trenches are excavated to widths in excess of the above limitations, or collapse because of insufficient bracing and sheeting, the contractor will be required to use special methods of constructing pipe foundations and backfilling as specified herein at his own expense.

The bottom of all trenches, except as otherwise specified shall be rounded to conform to the bottom of the pipe so as to afford full bearing on the pipe barrel. The Engineer shall direct the depth and width required for such shaping.

Excavation in excess of depth required for proper shaping shall be corrected by one of the special methods specified herein, as ordered by the Engineer. Bell holes shall be excavated so as to relieve pipe bells of all loads, but small enough to insure that support is provided throughout the length of the pipe barrel.

All pipe shall be laid on foundations prepared in accordance with the various classes of bedding required by the trench width and trench depth for the size of pipe to be laid, as shown on the detail plans and as specified as follows:

1) Class "A" bedding shall be either a concrete arch or concrete cradle constructed in accordance with the methods shown on the detail plans. Concrete shall be Class "B" and shall be poured to the full width of the trench. Pipe shall be laid to line and grade on concrete blocking where the cradle method is used, after which the concrete shall be placed to the limits shown.

2) Class "B" bedding shall be either a compacted, coarse granular material placed on a flat bottom trench, or a shaped trench bottom with a layer of compacted, fine moist, granular material, constructed in accordance with the methods shown on the detail plans. The shaped bottom method may be used only where trenches are dry and suitable foundation and backfill material is available.

3) Alternate Class "B" bedding shall be undercut four (4) inches below the bottom of the pipe barrel, full width of the trench, and backfilled with compacted crushed stone, 3/4" and less or pea gravel with not less than 95% passing a 1/2-inch screen and 95% retained on a No. 4 screen. Stone or gravel shall be placed in layers of not more than 6-inches to the mid point of the pipe. From the mid point of the pipe, backfilling shall continue in accordance with the paragraph below.

4) Class "C" bedding shall be either a compacted, coarse, granular material placed on a flat bottom trench, or a shaped trench bottom with bell holes, constructed in accordance with the methods shown on the detail plans. The shaped bottom method may be used only where the trenches are dry and suitable foundation and backfill material is available.

5) Class "D" bedding, as shown on the detail plans, shall be a flat bottom trench with bell holes, and may be used only with the approval of the Engineer, for pipe sizes 6-inch to 12-inch inclusive, in dry trenches having suitable foundation and backfill material.

6) Bell holes shall be provided in all classes of bedding so as to relieve pipe bells of all loads, but small enough to insure that support is provided throughout the length of the pipe barrel.

7) Stone or gravel bedding material specified herein shall be used where directed by the Engineer and shall consist of crushed stone or pea gravel, clean and graded, 95% to 100% of

which shall pass a 1/2-inch sieve with 95% to 100% retained on a No. 4 sieve. Bedding material shall be placed on a flat bottom trench and thoroughly compacted by tamping or slicing with a flat blade shovel. Compacted bedding material shall be carried up the sides of the pipe to the heights shown on the detail plans for the various classes of bedding.

334100.4.1.2 All trenches and excavation shall be backfilled immediately after the pipes are laid therein, unless other protection of the pipeline is directed. The backfilling material shall be selected and deposited with special reference to the future safety of the pipes. Except where special methods of bedding and tamping are provided for, clean earth, sand or rock dust shall be solidly tamped about the pipe up to a level at least two (2) feet above the top of the pipes, and shall be carefully deposited in uniform layers, each layer solidly tamped or rammed with proper tools so as not to injure or disturb the pipe line. The remainder of the backfilling of the trench shall be carried on simultaneously on both sides of the pipes in such a manner that injurious side pressures do not occur.

After placing the backfill up to a level slightly below the natural ground surface, surplus excavation shall be windrowed and maintained in a suitable manner to concentrate and pond surface run-off from rains over the trench; after sufficient settlement has been obtained, in the opinion of the Engineer, the Contractor shall complete the dressing, removal of surplus materials and surface clean-up in accordance with these specifications.

All backfilling of excavated portions requiring pavement shall be mechanically tamped in 6-inch layers using heavy-duty tampers such as pneumatic jackhammers with tamping foot attachment. Each layer shall be thoroughly tamped to a density equivalent to at least 95% of an AASHO-T-99-49 Proctor Curve. Settlement in trenches shall be refilled with crushed stone or gravel and such maintenance shall continue until the Engineer authorizes pavement.

Walking or working on the complete pipe sewer, except as may be necessary in tamping or backfilling, shall not be permitted until the trench has been backfilled to a height of at least two (2) feet over the top of the pipes.

Whenever the trenches have not been properly filled, or if settlement occurs, they shall be refilled, smoothed off and finally made to conform to the surface of the ground. Backfilling shall be carefully performed and the original surface restored to the full satisfaction of the Engineer. Backfill in open trenches across sidewalks and in roadways shall be made as above specified, except that fill above pipes shall be deposited in layers not to exceed 6 inches and thoroughly compacted as provided elsewhere in these specifications. Surplus material shall be disposed of as directed by the Engineer.

334100.4.3 Joints -- At joints, the pipe ends shall be thoroughly cleaned and wet with water before the joint is made. Stiff mortar shall then be placed in the lower half of the bell or groove of the pipe section already laid. Mortar shall then be applied to the upper half of the spigot or tongue of the pipe section being laid. Then the spigot end of the pipe shall be inserted in the groove end of the pipe already laid, the joint pulled up tight so that the joint shall be pressed full. Care shall be taken to see that the inner surfaces of the abutting pipes are flush and even. On large diameter pipe laid on a curve alignment, after the joint has been pressed tight, the appropriate side of the last pipe laid will be carefully pulled open the proper amount to effect the

desired deflection. The joint shall then be checked again to see that the inner surfaces of the abutting pipes are even and properly aligned before finishing the joint as specified below.

After the section is laid, the inner circumference of the joints shall be sealed and packed with mortar and finished smooth and flush with the adjacent section of pipe. Additional mortar shall be applied from the outside and forced into the unfilled portion of the bell or groove to fill completely the annular space around the spigot or tongue.

Mortar joints shall be made with an excess of mortar to form a bead around the outside of the conduit. Pipes in excess of 36 inches in diameter shall have beads of not less than 4 inches in width nor less than 2 inches in thickness. The completed joints shall be protected against rapid drying by suitable covering material.

After placement of earth fill, any joints found not filled with mortar due to settlement or other reasons, shall be finished smooth and even with the inside surface of the pipe. On large diameter pipe laid on a curved alignment, all interior joints shall be carefully checked and all voids, gaps, or visible cracks shall be repaired and finished smooth.

334100.4.4 Catch Basins and Junction Boxes -- Catch basins and junction boxes shall be constructed in accordance with details on the drawings and shall be of true dimension and form.

Cast-in-place catch basins and junction boxes shall be constructed of 3,500-psi concrete and according to the material and construction specifications.

Bottoms for brick and concrete block manholes and catch basins shall be constructed of 3500 psi concrete and shall conform to the shape and form detailed on the drawings. Inverts for junction boxes shall be carefully and properly installed to suit the needs of each location.

Mortar for junction boxes and catch basins shall consist of one part Portland cement, one part hydrated lime, and six parts sand; or, two parts Masonry cement and six parts sand. All mortar shall be mixed with the least amount of water required for workability and shall be used before initial set has occurred. Retempering of mortar will not be permitted.

Brick catch basins and junction boxes shall be constructed by experienced masons on precast or cast-in-place concrete bottoms of the dimension and shape shown on the drawings. Brick shall be laid in level courses in mortar, as specified, with mortar joints approximately 1/2" thick. The joints shall be completely filled with mortar and inside joints struck flush. Steps shall be placed in each catch basin at 12" intervals. They shall be properly aligned and set level. Cast iron frames and gates shall be properly set in a bed of mortar and aligned to fit the brickwork.

Precast catch basins and junction boxes shall be installed as follows:

1) Precast base sections shall be installed on a firm, stabilized foundation so prepared to prevent settlement and misalignment. Pipe openings shall be exactly aligned to that of the pipe entering and leaving the junction boxes.

2) Cement mortar joints shall be carefully made to the manufacturer's requirements. Grout shall be as stiff as possible to be consistent with good practice and all joints shall be well filled.

334100.5 Clean Up

334100.5.1 Clean up shall be as specified in Section 01 74 01, Clean Up, or by the Engineer.

SECTION 334101
HIGH-DENSITY POLYETHYLENE PIPE (HDPE)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section includes construction of high-density polyethylene pipe for storm drainage culverts including appurtenances normally installed as a part of these systems. Construction may include surface preparation, trench excavation, shoring, dewatering, lay, align, and join pipe, installation of appurtenances, bedding and backfilling, surface restoration, and other related work.

1.2 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS, which may be related to this section:

1. Section 31 10 00, General Site Work

2. Section 31 30 00, Earthwork

3. Section 31 25 00, Erosion Control

1.3 REFERENCES

A. The following is a list of standards, which may be referenced in this section.

1. American Association of State Highway and Transportation Officials (AASHTO):

a. M252, Standard Specification for Corrugated Polyethylene Drainage Tubing.

b. M294, Standard Specification for Corrugated Polyethylene Pipe.

c. Section 18, Soil Thermoplastic Pipe Interaction Systems.

2. ASTM International (ASTM):

a. D638, Standard Test Method for Tensile Properties of Plastic.

b. D1056, Specification for Flexible Cellular Materials - Sponge and Expanded Rubber.

c. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

d. D3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

e. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Material.

f. D4976, Specification for Polyethylene Plastics Molding and Extrusion Materials.

g. F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

h. F667, Standard Specification for Large Diameter Corrugated Polyethylene Tubing and Fittings.

i. F894, Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe

j. F2306, Standard Specification for 12 to 60 in. Annular Corrugated Profile- Wall Polyethylene Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications.

k. F2562, Specifications for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage.

l. F2620, Standard Practice for Heat Fusion Joining of Polyethylene Pipe and fittings.

3. Plastic Pipe Institute (PPI):

a. Handbook of Polyethylene Pipe.

b. TR-33, Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe.

1.4 SUBMITTALS

A. Details of fittings and specials shall be furnished for approval by ENGINEER.

B. Unless otherwise specified, CONTRACTOR shall submit to ENGINEER for approval SHOP DRAWINGS showing the exact dimension of the joints including the permissible tolerances for each size of pipe being furnished and the size, type and locations of gasket materials. Approval of the joint detail DRAWINGS shall not relieve CONTRACTOR of any responsibilities to meet

all of the requirements of these SPECIFICATIONS, or of the responsibility for correctness of CONTRACTOR's details.

C. CONTRACTOR shall submit certified laboratory test certificates for all items required in this section.

D. CONTRACTOR shall cooperate with ENGINEER in obtaining and providing samples of all specified materials.

1.5 QUALITY ASSURANCE

A. Manufacturer:

1.Experienced in the design, manufacture, and commercial supplying of the specific material for a minimum period of five (5) years.

2. Experienced in the design, manufacture, and commercial supplying of the specific size of pipe for a period of one (1) year.

3. Certify to above minimum experience requirements.

B.All HDPE pipe and fittings shall be from a single manufacturer. All HDPE pipe to be installed may be inspected at the factory for compliance with these SPECIFICATIONS by an independent testing laboratory provided by the OWNER. The CONTRACTOR shall require the manufacturer's cooperation in these inspections. The cost of these plant inspections of all pipe approved, plus the cost of inspection of a reasonable amount of disapproved pipe, will be borne by the OWNER.

C. Inspection of the pipe shall also be made by the ENGINEER or other representatives of the OWNER after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the SPECIFICATION requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Responsibility for Material:

1. Shipping: Material shall be shipped so to not cut, kink, or otherwise damage pipe during transport.

2. CONTRACTOR shall be responsible for all materials intended for the WORK that are delivered to the construction site and accepted by CONTRACTOR. Payment shall not be made for materials found to be defective or damaged in handling after delivery and acceptance. Defective or damaged materials shall be removed and replaced with acceptable materials at CONTRACTOR's expense.

3. CONTRACTOR shall be responsible for the safe and proper storage of such materials.

a.Limit stacking of pipe to a height that will not cause excessive deformation of bottom layers of pipes under anticipated temperature conditions.

b.Where necessary, because of ground conditions, store pipe on wooden sleepers, spaced suitably and of such widths as not to allow deformation of pipe at point of contact with sleeper or between supports.

c. Keep pipe shaded from direct sunlight prior to installation in the trench.

B. Pipe Acceptance:

1. In addition to any deficiencies not covered by the applicable ASTM Specifications, pipe, which has any of the following visual defects, will not be accepted.

a. Cracks, bubbles, pinholes, inclusions or occlusions, which, because of their nature, degree, or extent, detrimentally affect the strength and serviceability of the pipe.

C. Pipe Handling:

1. Pipe and accessories furnished by CONTRACTOR shall be delivered to, unloaded, and distributed at the site by CONTRACTOR. Each pipe shall be unloaded adjacent to or near the intended laying location.

2.Pipe fittings, specials, valves, and appurtenances shall be unloaded and stored in a manner that precludes shock or damage. Such materials shall not be dropped.

3. Pipe shall be handled to prevent damage to the pipe ends or to any coating or lining. Pipe shall not be skidded or rolled against adjacent pipe. Damaged coatings or lining shall be repaired or replaced by CONTRACTOR, at CONTRACTOR's expense in accordance with the recommendations of the manufacturer and in a manner satisfactory to Engineer. Physical damage to the pipe or accessory shall be repaired or replaced by CONTRACTOR at CONTRACTOR's expense, and in a manner satisfactory to ENGINEER.

D.Gasket Storage: All gaskets shall be stored in a cool place, preferably at a temperature of less than seventy degrees Fahrenheit (70°F.), and in no case shall the gaskets be stored in the open, or exposed to the direct rays of the sun.

PART 2 PRODUCTS

2.1 MATERIALS

A.General: HDPE pipe, which does not conform to ASTM D3350, ASTM D 4976, ASTM F667, ASTM F894, ASTM F2306, or ASTM F2562 or to any other requirement specified herein, shall not be approved for storm sewer, culvert, or sanitary sewer installations.

B. Allowable Pipe diameters for this specification shall be between eighteen (18) inches to thirty-six (36) inches unless approved by ENGINEER and OWNER.

C. Allowable ASTM Specifications: All material, manufacturing operations, testing, inspection, and making of HDPE pipe shall conform to the requirements of the appropriate allowable ASTM Standard Specifications, latest revision thereof, listed in Article References.

D. Marking:

1. The following shall be clearly marked on both the interior and exterior surface of the pipe:

a. Class and size.

b. Date of manufacture.

c. Name or trademark of manufacturer.

d. Deflection angle for bends.

E.Diameter of Pipe: The diameter indicated on the DRAWINGS shall mean the inside diameter of the pipe.

F. Wall Thickness and Class of Pipe:

1. The wall thickness shall comply with the appropriate ASTM Specification and the class of pipe designated on the DRAWINGS.

2. HDPE pipe and fittings shall have a smooth interior and corrugated exterior. 18-inch through 36-inch pipe shall meet the requirements of AASHTO M294 Type S. The pipe shall have a full

circular cross-section with annular corrugations. Pipe shall be produced to constant internal diameters.

3. Pipe and fittings shall be made of high-density, high-molecular weight polyethylene material meeting the requirements of cell classification 324420C or higher in accordance with ASTM D3350. Clean rework material generated by the manufacturer's own production may be used so long as the pipe or fittings produced meet all the requirements of this SPECIFICATION.

G. Fittings and Specials:

1. Elbows and fittings shall be mitered from pipe sections welded together on the interior and exterior at all junctions.

2. The pipe sections forming the miters shall be cut to fit with no gap.

3. Tolerances on the angle of all elbows shall be plus or minus 1 degree.

4. The standard turning radius of elbows shall be 1.5 times the inside diameter. Special turning radii shall be used for special applications.

5. Elbows shall conform to the following requirements:

Angle of Elbow (Degrees)	Number of Miters
0 to 45	1
45 to 90	2

6. Elbows shall be designed to prevent joint rupture resulting from dynamic forces or application of a test pressure of 25 psi.

H. Joints:

1. Watertight joints shall be accomplished by rubber gasket, in accordance with ASTM D3212.

2. Gaskets shall be closed-cell synthetic, expanded rubber meeting the requirements of ASTM D1056, Grade 2A2 or made of polyisoprene meeting ASTM F477. Gaskets shall be installed on the connection by the pipe manufacturer.

3. Lubricant shall have no detrimental effect on the gasket of on the pipe.

4. Integral bell and spigot gasketed joints shall be designed so that when assembled, the elastomeric gasket, contained in a machined groove on the pipe spigot, is compressed radially in the pipe bell to form a positive seal. The joint shall be designed to avoid displacement of the gasket when installed in accordance with the manufacturer's recommendations.

PART 3 EXECUTION

3.1 GENERAL

A. The pipe and pipe coatings shall be inspected by ENGINEER for damage or defects before being placed in the trench. Damaged or defective pipe shall not be installed.

B. All pipes, which do not meet the requirements of PART 2 of this section, will be rejected and replaced at CONTRACTOR's expense.

C.CONTRACTOR shall install storm sewer pipe of the type, diameter, load class, wall thickness, and protective coating that is shown on the DRAWINGS.

D. Proper equipment, implements, tools, and facilities shall be provided and used by CONTRACTOR for safe and convenient installation of the type of pipe being installed.

3.2 SURFACE PREPARATION

A. Within Easement, Cultivated, Landscaped, or Agricultural Area:

1.All vegetation, such as brush, sod, heavy growth of grass or weeds, decayed vegetable matter, rubbish and other unsuitable material within the area of excavation and trench side storage shall be stripped and disposed of in accordance with the requirements of Section 31 11 00, Clearing and Grubbing.

2. Topsoil shall be removed to a depth of eight (8) inches or the full depth of the topsoil, whichever is less. Topsoil shall be removed from the area to be excavated and stockpiled, or, CONTRACTOR may elect to import topsoil to replace that lost during excavation.

B. Within Unpaved Roadway Areas: CONTRACTOR shall strip the cover material from graveled roadways or other developed, but unpaved traffic surfaces to the depth of the existing surfacing. The surfacing shall be stockpiled to the extent that is acceptable and useable for restoration purposes.

C. Within Paved Areas:

1. The removal of pavement, sidewalks, driveways, or curb and gutter shall be performed in a neat and workmanlike manner. Concrete pavement, asphalt, sidewalks, driveways, or curb and gutter shall be cut with a power saw to a depth of two (2) inches prior to breaking. The concrete shall be cut vertically in straight lines and avoiding acute angles.

2. Bituminous pavement, sidewalks, driveways, or curb and gutter shall be cut with a power saw, pavement breaker, or other approved method of scoring the mat prior to breaking or excavation. The bituminous mat shall be cut vertically, in straight lines and avoiding acute angles.

3. Any overbreak, separation, or other damage to the existing bituminous or concrete outside the designated cut lines shall be replaced at CONTRACTOR's expense.

4. Excavated paving materials shall be removed from the job site and shall not be used as fill or backfill.

3.3 DEWATERING

A. All pipe trenches and excavation for structures and appurtenances shall be kept free of water during pipe laying and other related work. The method of dewatering shall provide for a dry foundation at the final grades of excavation in accordance with Section 31 23 19, Dewatering. Water shall be disposed of in a manner that does not inconvenience the public or result in a menace to public health. Pipe trenches shall contain enough backfill to prevent pipe flotation before dewatering is discontinued. Dewatering shall continue until such time as it is safe to allow the water to rise in the excavation.

3.4 INSTALLATION

A.General: Precautions shall be taken to prevent foreign material from entering the pipe before or while it is being placed in the line. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe. The open ends of pipe shall be closed with a watertight plug, or with other devices approved by ENGINEER, at times when pipe laying is not in progress.

B. Pipe:

1. Pipe shall be installed in accordance with the manufacturer's recommendations for installing the type of pipe used, unless otherwise shown on the DRAWINGS.

2. Pipelines shall be laid to the grades and alignment shown on the DRAWINGS or staked by ENGINEER. Variation from the prescribed grade and alignment shall not exceed one-tenth (0.10) foot, and the rate of departure from, or return to, the established grade or alignment shall be not more than one (1) inch in ten (10) feet, unless approved by ENGINEER. No deviation from grade shall cause a depression in the sewer invert that could retain fluids or solids. Any pipe which is not in true alignment or which shows undue settlement after laying shall be taken up and re-laid at CONTRACTOR'S expense.

3. Lift or roll pipe to protect coating. Do not drag over gravel or rock. Avoid striking rocks or hard objects when lowering into trench.

a. Pipe on which coatings have been damaged may be rejected at the site of the Work regardless of previous approvals.

C. Pipe Fittings:

1. Pipe fittings shall be laid so as to form a close concentric joint with the adjoining pipe to avoid sudden offsets of the flowline. Pipe sections shall be joined together in accordance with the manufacturer's recommendations.

2. Pipe fittings and appurtenances shall be carefully lowered into the trench with suitable tools or equipment to prevent damage to the pipe and protective coatings and linings; pipe and accessory materials shall not be dropped or dumped into the trench.

D. Gaskets: No gaskets that show signs of deterioration, such as surface cracking or checking, shall be installed in a pipe joint. The neoprene gaskets used, when the air temperature is ten degrees Fahrenheit (10°F) or lower shall be warmed to temperature of sixty degrees Fahrenheit (60°F) for a period of thirty (30) minutes before being placed on the pipe.

E. Obstructions not shown on the DRAWINGS may be encountered during the progress of the WORK. Should such an obstruction require an alteration to the pipe alignment or grade, ENGINEER will have authority to order a deviation from the DRAWINGS, or ENGINEER may arrange for the removal, relocation, or reconstruction of any structure which obstructs the pipeline.

3.5 BEDDING AND BACKFILL FILLING

A. Select bedding and backfill material may be required and shall be so shown on the DRAWINGS. Select bedding materials shall conform to the designated gradation requirements in Section 31 23 33, Trenching and Backfilling.

B. Bedding material shall be placed under and around all pipes as shown on the DRAWINGS. Bedding shall be placed in a manner that will minimize separation or change in its uniform gradation. Bedding shall be distributed in six-inch (6") maximum layers over the full width of the trench and simultaneously on both sides of the pipe. Special care shall be taken to ensure full compaction under the haunches and joints of the pipe.

C. Backfill compaction shall not be attained by inundation or jetting, unless approved in writing by ENGINEER. Backfill material shall be uniformly compacted the full depth of the trench.

3.6 CONCRETE CUTOFF COLLARS

A. Concrete shall meet the requirements of Section 03 31 00, Structural Concrete.

3.7 FIELD TESTING

A. Acceptance Tests for Gravity and Low-Pressure Pipelines:

1. Alignment:

a. Sewer shall be inspected by flashing a light between manholes or by physical passage where space permits.

b. Contractor shall clean pipe of joint sealant, other dirt, and debris prior to inspection.

c. Determine from Illumination or Physical Inspection:

1) Presence of any misaligned, displaced, or broken pipe.
2) Presence of visible infiltration or other defects.

B. Deflection Testing:

1. Maximum installed deflections of flexible pipe shall be five percent (5%) of mean internal diameter.

2. At the ENGINEER's discretion, CONTRACTOR shall test flexible pipe after backfill has been in place 30 days. Deflection is defined per ASTM D2321.

a. CONTRACTOR shall provide rigid ball or mandrel deflection testing equipment and labor.

b.Obtain approval of equipment and acceptance of method proposed for use in testing deflection of the pipe. Test shall be performed without mechanical pulling devices.

c. Pipe exceeding deflection limits, as defined in ASTM D2321, shall be replaced or re-compacted at CONTRACTOR's expense.

3.8 SURFACE RESTORATION

A. All streets, alleys, driveways, sidewalks, curbs, or other surfaces broken, cut or damaged by CONTRACTOR shall be replaced in kind or as shown on the DRAWINGS.

3.9 CLEAN UP

A. All rubbish, unused materials, and other non-native materials shall be removed from the job site. All excess excavation shall be disposed of as specified, and the right-of- way shall be left in a state of order and cleanliness.

END OF SECTION

SECTION 334913
PRECAST MANHOLES

334913.1 General

.1.1 precast manholes will be installed to the lines and grades shown on the plans.

334913.2 Material

.2.1 Precast Reinforced Concrete Manhole: All precast reinforced concrete manhole base, barrel and top sections shall be made of reinforced concrete, and shall conform to the minimum steel requirements of "Precast Reinforced Concrete Manhole Sections," ASTM C478-64T. Precast concrete manhole base, barrel, and top sections shall have the inside diameters shown on the plans with the minimum wall thickness shown. Precast sections shall be 2, 3, or 4 feet in length as required. All manholes shall consist of the combination of base and barrel sections resulting in the fewest number of joints. Precast top sections shall be of eccentric design as shown on the plans. Concrete for all manhole base sections shall be monolithically poured. Joints at the junction of the horizontal to the vertical base sections shall not be allowed. All sections shall be poured by means of the "Vertical Cast" method in accordance with AWWA Specification C-302, Paragraph 3.6.11. Each section shall be cured in their forms a minimum of 6 hours prior to stripping. All Bell and Spigot ends of manhole components shall contain reinforcement steel as outlined in ASTM Specification C-361, Paragraph 5.7.2. No tar, cement, paint or any other covering shall be placed on manhole components after casting. The joints between all precast sections shall be rubber ring type, conforming to the applicable section of "Reinforced Concrete Low-Head Pressure Pipe," ASTM Designation: C-361. A groove having a rectangular cross-section is cast into the outer surface of the spigot and retains the rubber ring gasket. One and a half inch (1-1/2") "rope" mastic joints meeting Federal Specification (GSA-FSS) 55-5-00210 will be allowed.

.2.2 Frames and Covers shall be of gray cast iron conforming to ASTM A-48, class, and shall be of type and weight indicated on the plans. Castings shall be free of any casting or machining defect that would impair its intended use. Unless otherwise shown on the plans, covers shall have two pick holes and one vent hole.

.2.3 Manhole Steps shall be of extruded aluminum, alloy 6061-T6. Each step shall be capable of supporting a concentrated live load of 350 pounds. Treads shall be of nonslip design and surfaces embedded in concrete coated with bituminous paint. Equivalent steps of cast iron or PVC coated steel may be used with the Engineer's approval.

334913.3 Construction

.3.1 Precast base sections shall be installed on a firm stabilized foundation so prepared as to prevent settlement and misalignment. Pipe openings shall be exactly aligned to that of the

pipe entering and leaving the manhole. Septic tank rock or crusher run shall be provided if bottom conditions warrant.

.3.2 Rubber ring joints shall be carefully made in accordance with the manufacturer's instructions and generally in the following manner. Bells shall be wiped clean, be free of all dirt or other matter, and liberally lubricated for receiving the spigot ends. The gasket groove and gasket shall be well cleaned and lubricated prior to placing.

.3.3 Cement mortar joints shall be carefully made to the manufacturer's requirements. Grout shall be as stiff as possible to be consistent with good practice and all joints shall be well filled.

.3.4 Cast iron frames and covers shall be properly set in a bed of mortar and aligned to fit the top section of the man-hole. Concrete brick set in mortar shall be used to adjust the top to finished grade, however no more than four courses of brick will be used for adjustment.

.3.5 Steps shall be properly placed at 16-inch intervals.

.3.6 Sewer pipe shall be placed in the openings provided in the base sections and properly aligned and set to grade. Rubber boots shall be used for connecting pipe to manholes where the presence of water prevents using grout.