CONTRACT DOCUMENTS AND SPECIFICATIONS

FOR

SITE IMPROVEMENTS TO THE GREENWOOD CONVENIENCE CENTER

FOR

FLORENCE COUNTY, SOUTH CAROLINA

ALLIANCE CONSULTING ENGINEERS, INC.
PROJECT NO. 15103-0021

APRIL 2015

BID DOCUMENTS

CONTRACTOR:
ADDRESS:
CONTRACTOR'S LICENSE NUMBER:

Alliance Consulting Engineers, Inc.
Post Office Box 8147
Columbia, SC 29202-8147
(803) 779-2078 ● (803) 779-2079 fax
www.allianceCE.com

SECTION 00005
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FOR
FLORENCE COUNTY, SOUTH CAROLINA
PROJECT NO. 15103-0021
APRIL 2015

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ADVERTISEMENT FOR BID

Owner: Florence County, South Carolina

Alliance Consulting Engineers, Inc. Project No.: 15103-0021

Separate sealed bids (**Bid Number 29-14/15**) for Site Improvements To The Greenwood Convenience Center In Florence County, South Carolina will be received at the **Florence County Complex located at 180 N. Irby St. MSC-R, Procurement Office Room B-5 until 2:45 p.m. on Thursday, June 25th, 2015** and then publicly opened and read aloud at the Florence County Complex located at **180 N. Irby St. MSC-R, Room 210-C at 3 p.m. on Thursday, June 25th, 2015**.. The work to be completed as a part of this project consists of providing all required materials, equipment and labor necessary to complete the Site Improvements to The Greenwood Convenience Center in Florence County, South Carolina, with the following approximate quantities:

Construction of 3,700 SY of twelve (12)-Inch GABC for Stone Drive, 2,150 SY of seven (7)-Inch GABC, 4,160 SY of two (2)-Inch Asphalt Binder Course, 4,160 SY of one and one half (1.5)-Inches of Ashpalt Surface Course, 1,200 SY of six (6)-Inch Concrete Paving with reinforcement, 150 LF of Concrete Retaining Wall with reinforcement and Railing, and Electrical equipment and associated feeders for three (3) Industrial Grade Trash Compactors..

The Instructions to Bidders, Bid Form, Contract, Plans, Specifications, Bid Bond, Performance Bond, Payment Bond, and other contract documents may be examined at the following locations:

Owner: Florence County
Mr. Patrick Fletcher, Procurement Director
Florence County Complex
Room B-5
180 N. Irby St. MSC-R
Florence, South Carolina 29501

Dodge Plan Rooms: (www.construction.com)
Engineers: (www.isqft.com)

Drawings, specifications, and contract documents may be obtained from the office of Alliance Consulting Engineers, Inc., Post Office Box 8147, Columbia, SC 29202-8147 upon a **non-refundable payment of $150**. When requesting drawings, specifications, or contract documents, provide the following information about your company: Mailing address; street (UPS) address; telephone number, email and FAX number (if applicable).

Bidders must deposit security with all bids. Security shall be in the form of a certified check or bid bond made payable to the Owner, and shall be for an amount equal to not less than five percent (5%) of the amount of the bid. Provisions of the security shall be as described in the Information for Bidders. No bid will be considered unless the bidder is legally qualified under the provisions of the South Carolina Sections 40-11-10 through 40-11-428).

NOTICE TO BIDDERS:

Each bidder shall fully acquaint himself with conditions of this Bid. The failure or omission of a bidder to acquaint himself with existing conditions shall in no way relieve him of any obligation with respect to this Bid or to the Contract.

BIDS WILL NOT BE CONSIDERED FROM ANY VENDOR THAT OWES DELINQUENT BUSINESS PROPERTY TAXES TO THE COUNTY OF FLORENCE.

NOTICE TO BIDDERS: Each bidder shall fully acquaint himself with the conditions relating to the scope and restrictions attending the execution of the work under the conditions of this Bid. The failure or omission of a bidder to acquaint himself with existing conditions shall in no way relieve him of any obligation with respect to this Bid or to the contract. All amendments to and interpretations of this solicitation shall be in writing and issued by Alliance Consulting Engineers, Inc. Florence County or Alliance Consulting Engineers, Inc. shall not be legally bound by any amendment or interpretation that is not in writing. **Award of the project is contingent on funding approval by the Florence County Council.**

No bidder may withdraw the bid within sixty (60) days after the actual date of the opening and thereof.

The Owner reserves the right to waive any informality or to reject any or all bids.

ENGINEERS
Alliance Consulting Engineers, Inc.
Post Office Box 8147
Columbia, South Carolina 29202-8147

OWNER
Florence County
Florence County Complex
Room B-5
180 N. Irby St. MSC-R
Florence, South Carolina 29501

SECTION 00200

INFORMATION FOR BIDDERS

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ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. **Issuing Office**-The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from Alliance Consulting Engineers, Inc., P.O. Box 8147, Columbia, SC 29202-8147. The deposit will be nonrefundable and a FedEx account number must be provided for FedEx delivery of Plan Sets.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five (5) days of Owner's request, Bidder shall submit written evidence such as financial data; previous experience, present commitments.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

A. The General Conditions identify:

1. The reports of geotechnical exploration at or contiguous to the Site that Engineer has used in preparing the Bidding Documents including the Soil Borings have been completed for the project by S&ME, Inc ,Project No. 1439-15-003, "Report of Limited Geotechnical Exploration dated February 16, 2015 and enclosed herein.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.01.A are included herein. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

A. The General Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.03.A are included herein. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates. Engineer and Owner shall be notified prior to any site visits.

4.06 Reference is made to Article 7 of the General Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda.

B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities), which have been identified in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in Paragraph 4.06 of the General Conditions.

E. Obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site, which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder.

J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - SITE AND OTHER AREAS

5.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional land and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 6 - INTERPRETATIONS AND ADDENDA

6.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than seven (7) days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 7 - BID SECURITY

7.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent (5%) of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid Bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

7.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within fifteen (15) days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven (7) days after the Effective Date of the Agreement or sixty (60) days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

7.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within fourteen (14) days after the Bid opening.

ARTICLE 8 - CONTRACT TIMES

8.01 **Site Improvements To The Greenwood Convenience Center In Florence County, South Carolina is to be completed within one hundred eighty (180) calendar days after the Notice to Proceed has been issued.**

ARTICLE 9 - LIQUIDATED DAMAGES

9.01 Document Execution

A. The successful Bidder, upon failure or refusal to execute and deliver the contract and bonds within ten (10) days after they have received the notice of the acceptance of their bid, shall forfeit to the Owner, as liquidated damages, the security deposited with the bid.

9.02 Project Execution

A. Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within the dates specified in the Bid Form, Article 6; Paragraph 6.01. Bidder must agree also to pay as liquidated damages the sum as indicated in the Bid Form, Article 6; Paragraph 6.02 for each consecutive calendar day thereafter as hereinafter provided in the General Conditions.

ARTICLE 10 - SUBSTITUTE AND "OR-EQUAL" ITEMS

10.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 11 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.01 If the General Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five (5) days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

11.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

11.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

11.04 Each bidder shall fully acquaint himself with conditions of this Bid. The failure or omission of a bidder to acquaint himself with existing conditions shall in no way relieve him of any obligation with respect to this Bid or to the Contract. The deadline for submitting questions is **Thursday June 18th, 2015 at 5 p.m**

ARTICLE 12 - PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

12.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each unit price item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.

12.03 A Bid by a corporation shall be executed in the corporate name by the president, vice-president, or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

12.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

12.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

12.06 A Bid by an individual shall show the Bidder's name and official address.

12.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.

12.08 All names shall be typed or printed in ink below the signatures.

12.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

12.10 The address and telephone number for communications regarding the Bid shall be shown.

12.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 13 - BASIS OF BID; COMPARISON OF BIDS

13.01 Unit Price

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

13.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.

13.03 Bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in Article 9.

ARTICLE 14 - SUBMITTAL OF BID

14.01 With each copy of the Bidding Documents, a Bidder is furnished one (1) separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the following data:

A. Power of Attorney.
B. Certificate of Familiarity.

14.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, Contractor's License Number, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "**BID# 29-14/15**". A mailed Bid shall be addressed to:

Florence County
Attn: Patrick Fletcher, Procurement Director
Florence County Complex
Room B-5
180 N. Irby St. MSC-R
Florence, South Carolina 29501

ARTICLE 15 - MODIFICATION OF BID

15.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

ARTICLE 16 - OPENING OF BIDS

16.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids in the form of a Bid Tabulation and Bid Comparison. The Bid Opening Minutes will also be provided to all in attendance.

ARTICLE 17 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18 - EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, non-responsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

18.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

18.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

18.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the General Conditions.

18.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

18.06 If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.

18.07 The Owner reserves the right not to Award the Project.

ARTICLE 19 - CONTRACT SECURITY AND INSURANCE

19.01 Article 5 of the General Conditions sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 20 - SIGNING OF AGREEMENT

20.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within seven (7) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within seven (7) days thereafter, Owner shall deliver one (1) fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 21 - RETAINAGE

21.01 Retainage from progress payments to the Contractor shall be ten percent (10%) of each payment for work completed and stored materials on site.

SECTION 00410
BID FORM

SITE IMPROVEMENTS TO THE GREENWOOD CONVEINIENT CENTER
FOR
FLORENCE COUNTY, SOUTH CAROLINA

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ARTICLE 1 - BID RECIPIENT

1.01 This Bid is submitted to:

Florence County Procurement
Attn: Mr. Patrick Fletcher, Procurement Director
Florence County Complex
Room B-5
180 N. Irby St. MSC-R
Florence, South Carolina 29501

1.02 Bids are to be delivered to:

Florence County Procurement
Attn: Mr. Patrick Fletcher, Procurement Director
Florence County Complex
Room B-5
180 N. Irby St. MSC-R
Florence, South Carolina 29501

1.03 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty (60) days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date	Initials
_____	_____	_____
_____	_____	_____
_____	_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities), which have been identified in Paragraph 4.02 of General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in Paragraph 4.06 of General Conditions.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site, which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

K. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 - FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation.

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

C. Bidder has not solicited or induced any individual or entity to refrain from bidding.

D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 – BASIS OF BID

Base Bid

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following unit price(s):

Base Bid - Greenwood Convenience Center Site Improvements

Item No.	Description	Unit	Estimated Quantity	Unit Price	Bid Price
1	Mobilization/Bonds	LS	1	$	$
2	Construction Entrance/Exit	LS	1	$	$
3	Silt Fencing	LF	140	$	$
4	Rip Rap	SY	20	$	$
5	Sediment Tubes	EA	5	$	$
6	Grassing	AC	0.5	$	$
7	Earthwork (On-Site Excavation/Backfill/ Compaction)	LS	1	$	$
8	Earthwork (Excavation/Haul/Backfill/Compaction of Fill Import)	LS	1	$	$
9	Removal of Existing Concrete Slab	SY	110	$	$
10	Removal of Existing Storm Drainage Pipes	LF	85	$	$
11	12-Inch GABC for Truck Drive (Assume Reuse of Existing GABC)	SY	3,700	$	$
12	7-Inch Graded Aggregate Base Course (Asphalt Pavement Section)	SY	1,435	$	$
13	2-Inch Asphalt Binder Course (Type B)	SY	3,435	$	$
14	1.5-Inch Asphalt Surface Course (Type B)	SY	3,435	$	$
15	12-Inch Asphalt Curb	LF	200	$	$
16	6-Inch Graded Aggregate Base Course (Concrete Paving Section)	SY	1,500	$	$
17	Concrete Paving (6” w/ reinforcement)	SY	1,500	$	$
18	12-Inch RCP (Class 4 Storm Drainage Pipe)	LF	176	$	$
19	15-Inch RCP (Class 4 Storm Drainage Pipe)	LF	56	$	$
20	Striping	LS	1	$	$
21	6-Foot High Galvanized Chain Link Fence (with Barb Wire)	LF	830	$	$
22	30-Inch High Black Chain Link Fence (Top of Retaining Wall)	LF	45	$	$
23	20-Foot Double Swing Gate	EA	2	$	$
24	30-Foot Roll Gate	EA	2	$	$
25	15-Foot Roll Gate (Top of Retaining Wall)	EA	3	$	$
26	Concrete Retaining Wall and Reinforcement	LF	150	$	$
27	Pipe Bollards	EA	16	$	$
28	12-Inch Concrete Key	EA	1	$	$
29	Demolition of Electrical Feed to Existing Compactor	LS	1	$	$
30	Electrical Equipment & Associated Feeders	LS	1	$	$
31	Wiring Compactors	EA	3	$	$
32	1-1/4-Inch Dia. Electrical Conduits (compactors)	LF	120	$	$
33	2-Inch Dia. Electrical Conduits (future site lighting)	LF	460	$	$
34	4-Inch Dia. Electrical Conduits (main electrical feed)	LF	180	$	$
35	1/4-Inch thick 2-Foot Wide 25-Foot Long Steel Plates for Compactor Casters	EA	6	$	$
36	2-Inch Black PE Water Pipe (include connection to existing water source)	LF	240	$	$
37	Hose Bibb	EA	2	$	$

Total Base Bid: $ _____

_____ Dollars _____ Cents

($_____)

Base Bid Alternate No. 1 –

Credit to Remove Asphalt and GABC Base from sloped areas next to Ramps

Item No.	Description	Unit	Estimated Quantity	Unit Price	Bid Price
1	12-Inch GABC for Truck Drive (Assume Reuse of Existing GABC)	SY	(405)	$	$
2	2-Inch Asphalt Binder Course (Type B)	SY	(405)	$	$
3	1.5-Inch Asphalt Surface Course (Type B)	SY	(405)	$	$

Base Bid Alternate No. 1: $ _____

_____ Dollars _____ Cents

($_____)

Base Bid Alternate No. 2 –

Credit to Remove Asphalt from Area Inside of Storage Area Fence

Item No.	Description	Unit	Estimated Quantity	Unit Price	Bid Price
1	2-Inch Asphalt Binder Course (Type B)	SY	(450)	$	$
2	1.5-Inch Asphalt Surface Course (Type B)	SY	(450)	$	$

Base Bid Alternate No. 2: $ _____

_____ Dollars _____ Cents

($_____)

Base Bid Alternate No. 3 – Utilize Asphalt Entrance Drives in lieu of Asphalt

Item No.	Description	Unit	Estimated Quantity	Unit Price	Bid Price
1	12-Inch GABC for Truck Drive (Assume Reuse of Existing GABC)	SY	307	$	$
2	2-Inch Asphalt Binder Course (Type B)	SY	307	$	$
3	1.5-Inch Asphalt Surface Course (Type B)	SY	307	$	$
4	6-Inch Graded Aggregate Base Course (Concrete Paving Section)	SY	(307)	$	$
5	Concrete Paving (6” w/ reinforcement)	SY	(307)	$	$

Base Bid Alternate No. 3: $ _____

_____ Dollars _____ Cents

($_____)

Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.
The above unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to complete the finish work as stipulated in the Bid Documents.
Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 - TIME OF COMPLETION

6.01 **Bidder agrees that the Work: Site Improvements To The Greenwood Convenience Center In Florence County, South Carolina is to be completed within one hundred eighty (180) calendar days for the Base Bid scope of work after the Notice to Proceed has been issued.**

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract dates in the amount of $500 per day for each calendar day required to complete the work in the manner and within the dates as stated in Paragraph 6.01 above.

ARTICLE 7 - ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid security in the form of five percent (5%) of the total bid amount.

B. Power of Attorney.

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders and General Conditions.

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)

(Individual's signature)

Title: _____

Doing business as: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____

(Signature of general partner -- attach evidence of authority to sign)

Title: _____

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____(CORPORATE SEAL)

Attest _____

Date of Authorization to do business in *[South Carolina]* is ____/____/____.

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____

(Signature of first joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____

(Signature of second joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address _____

_____

_____

Telephone No.: _____ Fax No.:_____

SUBMITTED on _____, 2015.

State Contractor License No. _____.

***NOTE: If NOT BIDDING, Complete the attached "No Bid" Response Form and return to Florence County.

The attached Certificate of Familiarity must be returned with Bid.

SECTION 00430

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address): **Florence County**
Attn: Mr. Patrick Fletcher, Procurement Director
Florence County Complex
Room B-5
180 N. Irby St. MSC-R
Florence, South Carolina 29501

BID
Bid Due Date: **Thursday, June 25th, 2015 at 2:45 p.m.**

Project (Brief Description Including Location): **Site Improvements to the Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**

BOND
Bond Number:
Date (Not later than Bid due date):
Penal sum _____ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	SURETY
(Seal)	(Seal)
_____	_____
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest: _____	Attest: _____
Signature and Title	Signature and Title

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:
   3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
   3.2. All Bids are rejected by Owner, or
   3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00510

NOTICE OF AWARD

Dated _____

Project: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**	Owner: **Florence County, South Carolina**	Owner's Contract No.:
Contract: **Site Improvements To The Approximately Two (2)-Acre Greenwood Convenience Center In Florence County, South Carolina**		Engineer's Project No.: **15103-0021**

Bidder:

Bidder's Address: (send Certified Mail, Return Receipt Requested):

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for Southeast Collection and Recycling Center for Florence County, South Carolina.

The Contract Price of your Contract is _____ _____($_____).

___ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

___ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within seven (7) days of the date you receive this Notice of Award.

1. Deliver to the Owner five (5) fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01).
3. Other conditions precedent:

   None

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within seven (7) days after you comply with the above conditions, Owner will return to you one (1) fully executed counterpart of the Contract Documents.

Florence County
Owner

By:_____
Authorized Signature

Mr. Patrick Fletcher, Procurement Director
Title

Acceptance of Notice

Receipt of the above Notice of Award is hereby acknowledged by _____
This the _____ day of _____, 2015.

_____
Contractor

By:_____
Authorized Signature

_____
Title

Copy to Engineer

SECTION 00520

CONTRACT

THIS AGREEMENT is by and between **Florence County**

(hereinafter called "Owner") and _____

doing business as an **individual/a partnership/a corporation/a joint venture** (strike out inapplicable terms), with its primary office in the City of _____, County of _____, State of _____.

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Site Improvements to the Approximately Two (2) Acre Greenwood Convenience Center for Florence County, South Carolina

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Site Improvements to the Approximately Two (2) Acre Greenwood Convenience Center for Florence County, South Carolina

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by: Alliance Consulting Engineers, Inc., who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Dates for Substantial Completion and Final Payment

Contractor agrees that the work: Site Improvements to the Approximately Two (2) acre Greenwood Convenience Center for Florence County, South Carolina within one hundred eighty (180) calendar days for the scope of work after the Notice to Proceed has been issued.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $500 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in the Bid Form attached hereto as part of these Contract Documents.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 30th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

a. **90%** of Work completed (with the balance being Retainage).

b. **90%** of cost of materials and equipment not incorporated in the Work (with the balance being Retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to **90%** of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less **10%** of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 – CONTRACTOR'S REPRESENTATIONS

7.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in Paragraph 4.06 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 8 - CONTRACT DOCUMENTS

8.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (Section 00520).
2. Performance Bond (Section 00610).
3. Payment Bond (Section 00615).
4. General Conditions (Section 00700).
5. Contractor/Subcontract Qualifications (Section 00950)
6. Drawings Index (Section 00951)
7. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid (Section 00410)
8. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
    a. Notice to Proceed (Section 00550).
    b. Work Change Directives as issued.
    c. Change Order(s) as issued.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 9 - MISCELLANEOUS

9.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions.

9.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. One counterpart each has been delivered to Owner, Contractor, Engineer and provided to the Contractor for his Bonding Agency. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on this _____ day of _____, 2015 (which is the Effective Date of the Agreement).

OWNER:	CONTRACTOR:
Florence County	
By:	By:
Mr. Patrick Fletcher, Procurement Director	
Title:	Title:
[CORPORATE SEAL]	[CORPORATE SEAL]
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:
Florence County Complex	
Room B-5	
180 N. Irby St. MSC-R	
Florence, South Carolina, 29501	
	License No.: (Where applicable)
	Agent for service or process:

SECTION 00550

NOTICE TO PROCEED

Dated: _____

Project: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**	Owner: **Florence County, South Carolina**	Owner's Contract No.:
Contract: **Site Improvements To The Approximately Two (2)-Acre Greenwood Convenience Center In Florence County, South Carolina**		Engineer's Project No.: **15103-0021**

Contractor:

Contractor's Address: [send Certified Mail, Return Receipt Requested]

You are notified that the Contract Times under the above contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is _____, and the date of readiness for final payment is _____.

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

	Florence County
Contractor	Owner
by:	Given by:
	Mr. Patrick Fletcher,
	Procurement Director
Title	Title
Date	Date

Copy to Engineer

SECTION 00610

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address): **Florence County**
Florence County Complex
Room B-5
180 N. Irby St. MSC-R
Florence, South Carolina 29501

CONTRACT
Date:
Amount:
Description (Name and Location): **Site Improvements To The Approximate Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

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

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

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

   3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

   3.3. Owner has agreed to pay the Balance of the Contract Price to:

      1. Surety in accordance with the terms of the Contract;

      2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

   4.1. Arrange for Contractor, with consent of Owner, 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 Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner'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 Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

   4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or

      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

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

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

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

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price 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 Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

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

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory 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.

12. Definitions.

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

   12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

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

   12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker:
Owner's Representative (engineer or other party): **Alliance Consulting Engineers, Inc.**
P.O. Box 8147
Columbia, SC 29202-8147
(803) 779-2078

SECTION 00615

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER: **Florence County**
Florence County Complex
Room B-5
180 N. Irby St. MSC-R
Florence, South Carolina 29501

CONTRACT
Date:
Amount:
Description (Name and Location): **Site Improvements To The Approximate Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

(Space is provided below for signatures of additional parties, if required.)

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

   2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

   2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

   4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

   4.2. Claimants who do not have a direct contract with Contractor:

      1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

      2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

      3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

   6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

   6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner 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.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory 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.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

   15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of 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 Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

   15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

   15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker:
Owner's Representative: **Alliance Consulting Engineers, Inc.**
P.O. Box 8147
Columbia, SC 29202-8147
(803) 779-2078

SECTION 00620

APPLICATION FOR PAYMENT

Contractor's Application For Payment No. _____

	Application Period:	Application Date:
To (Owner): **Florence County**	From (Contractor):	Via (Engineer) Alliance Consulting Engineers, Inc.
Project: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: **15103-0021**

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	$	
2. Net change by Change Orders	$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2)	$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	$	
5. RETAINAGE:		
a. _____ % x $_____ Work Completed	$	
b. _____ % x $_____ Stored Material	$	
c. Total Retainage (Line 5a + Line 5b)	$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	$	
8. AMOUNT DUE THIS APPLICATION	$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	$	

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of: $_____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ _____
Kyle M. Clampitt, P.E. (Date)

Payment of: $_____
(Line 8 or other - attach explanation of other amount)

is approved by: _____ _____
Mr. Patrick Fletcher, Procurement Director (Date)

Progress Estimate

Contractor's Application

For (contract): **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**	Application Number:
Application Period:	Application Date:

A		B	Work Completed		E	F		G
Item			C	D				
Specification Section No.	Description	Scheduled Value	From Previous Application (C + D)	This Period	Materials Presently Stored (not in C or D)	Total Completed and Stored to Date (C + D + E)	% (F/B)	Balance to Finish (B - F)
	Totals							

Progress Estimate

Contractor's Application

For (contract): **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**		Application Number:
Application Period:		Application Date:

A				B	C	D	E	F		G
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F) B	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

Stored Material Summary

Contractor's Application

For (contract): **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**									Application Number:
Application Period:						Application Date:			
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
			Date (Month/Year)	Amount ($)	Amount ($)	Subtotal	Date (Month/Year)	Amount ($)	
		Totals							

SECTION 00625

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**	Owner: **Florence County**	Owner's Contract No.:
Contract: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**		Date of Contract:
Contractor:		Engineer's Project No.: **15103-0021**

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer: Kyle M. Clampitt, P.E., Alliance Consulting Engineers, Inc. Date

Accepted by Contractor: Date

Accepted by Owner: Mr. Patrick Fletcher, Procurement Director Date

SECTION 00690

CONTRACTOR'S AFFIDAVIT

The State of _____ Date: _____

The County of _____

The City/Town of _____

_____ _____ of _____
(Officer's Name) (Officer's Title) (Contractor's Name)

being duly sworn, deposes and says that _____
(Contractor's Name)

has furnished all labor and material entering into the **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina** **for** **Florence County, South Carolina**
(Kind of Work) (Name and Location of Work)

called for in the Contract Documents dated _____ with _____

Florence County states further that this officer has full knowledge of all obligations for such labor and
(Owner's Name)
materials, which have entered into and become part of that certain project known and designated above, and that this officer further deposes and says that all debts and other obligations for such labor and materials have been fully and completely paid for in good and lawful money of the United States of America and that there are no suits for damages against them proceeding, prospective and/or that there are no suits for damages against them proceeding, prospective, or otherwise, in consequence of their operations on the above said project.

The said _____ will hold the Owners,
(Contractor's Name)
Florence County, blameless of any and all mechanic's liens that may be hereafter entered or filed for
(Owner's Name)
record, so as to constitute charge against said premises for work or labor done or materials furnished by them.

IN WITNESS HEREOF, this officer has heretofore put his hand and seal:

_____(Seal)
(Officer's Name)

I, _____, Notary Public in and for the above named County and State do

hereby certify that _____ personally known to me to be the affiant in the
(Officer's Name)
foregoing Affidavit, personally appeared before me this day and, having been duly sworn, deposes and says that the facts set forth in the above Affidavit are true and correct.

WITNESS my hand and seal this ____ day of _____, 2015

_____ (Seal)

Notary Public for the State of _____My Commission Expires: _____

SECTION 00700

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

PART 1 - DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified Parts and paragraphs, and the titles of other documents or forms.

1. Addenda – Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. Agreement – The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. Application for Payment – The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. Asbestos – Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. Bid – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. Bidder – The individual or entity who submits a Bid directly to Owner.

7. Bidding Documents – The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. Bidding Requirements – The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. Change Order – A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. Claim – A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. Contract – The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. Contract Documents – Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. Contract Price – The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. Contract Times – The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. Contractor – The individual or entity with whom Owner has entered into the Agreement.

16. Cost of the Work – See Paragraph 11.01.A for definition.

17. Drawings – That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. Effective Date of the Agreement – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. Engineer – The individual or entity named as such in the Agreement.

20. Field Order – A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. General Requirements – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. Hazardous Environmental Condition – The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. Hazardous Waste – The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. Laws and Regulations; Laws or Regulations – Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. Liens – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. Milestone – A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. Notice of Award – The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. Notice to Proceed – A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. Owner – The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. PCBs – Polychlorinated biphenyls.

31. Petroleum – Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. Progress Schedule – A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. Project – The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. Project Manual – The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. Radioactive Material – Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. Related Entity – An officer, director, partner, employee, agent, consultant, or subcontractor.

37. Resident Project Representative – The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. Samples – Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. Schedule of Submittals – A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. Schedule of Values – A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. Shop Drawings – All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. Site – Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. Specifications – That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

44. Subcontractor – An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. Substantial Completion – The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.

46. Successful Bidder – The Bidder submitting a responsive Bid to whom Owner makes an award.

47. Supplementary Conditions – That part of the Contract Documents which amends or supplements these General Conditions.

48. Supplier – A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. Underground Facilities – All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. Unit Price Work – Work to be paid for on the basis of unit prices.

51. Work – The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. Work Change Directive – A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. Intent of Certain Terms or Adjectives

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered”, “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. Day

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. Defective

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. Furnish, Install, Perform, Provide

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

PART 2 - PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. Evidence of Insurance: Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the General Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Part 5.

2.02 Copies of Documents

A. Owner shall furnish to Contractor up to six (6) printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 Starting the Work

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 Before Starting Construction

A. *Preliminary Schedules:* Within ten (10) days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review**:**

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 Preconstruction Conference

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 Initial Acceptance of Schedules

A. At least ten (10) days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional ten (10) days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

PART 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 Intent

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Part 9.

3.02 Reference Standards

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Amending and Supplementing Contract Documents

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 Reuse of Documents

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 Electronic Data

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

PART 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 Availability of Lands

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 Subsurface and Physical Conditions

A. Reports and Drawings: Reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents including the Soil Borings have been completed for the project by ECS, LLP dated July 10, 2012.

4.03 Differing Subsurface or Physical Conditions

A. Notice: If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4 is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. Engineer's Review: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

   b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

   a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

   c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 Underground Facilities

A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

   a. reviewing and checking all such information and data,

   b. locating all Underground Facilities shown or indicated in the Contract Documents,

   c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. Not Shown or Indicated

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 Reference Points

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 Hazardous Environmental Condition at Site

A. Reports and Drawings: No reports on drawings related to Hazardous Environmental Conditions are known to the Owner or Engineer.

B. Limited Reliance by Contractor on Technical Data Authorized: Not used.

PART 5 - BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 Licensed Sureties and Insurers

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications.

5.03 Certificates of Insurance

A. Contractor shall deliver to Owner, with copies to each additional insured, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

C. Failure of Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability order the indemnities granted to Owner in the Contract Documents.

5.04 Contractor's Liability Insurance

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

    a. Contractor shall furnish Owner and each other additional insured to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:

    a. State: South Carolina
    Statutory Benefits

    b. Applicable Federal (e.g., Longshoreman's): Statutory

    c. Employer's Liability:

Each Accident	$500,000
Disease–Policy Limit	$500,000
Disease-Each Employee	$500,000

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor and for this project only:

a. General Aggregate	$2,000,000
b. Products - Completed Operations Aggregate	$2,000,000
c. Personal and Advertising Injury	$1,000,000
d. Each Occurrence (Bodily Injury and Property Damage)	$1,000,000
e. Fire Damage (any one (1) fire)	$50,000
f. Medical Expense (any one (1) person)	$5,000

    g. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.

h. Excess or Umbrella Liability

1) General Aggregate $2,000,000

2) Each Occurrence $2,000,000

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Include coverage for all owned, hired and non-owned automobiles.

b. Combined Single Limit of $1,000,000

4. The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

a. Bodily Injury:
Each Accident $2,000,000
Annual Aggregate $2,000,000

b. Property Damage:
Each Accident $2,000,000
Annual Aggregate $2,000,000

5. Flood Insurance: The Contractor is required to carry flood insurance for projects located in designated flood hazard areas in which Federal Flood Insurance is available.

5.05 Owner's Liability Insurance

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 Property Insurance

A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof.

1. This insurance shall:

a. include the interests of Owner, Contractor, Subcontractors, Engineer and any other individuals or entities identified herein, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

b. in addition to the individuals and entities specified, include as additional insureds, the following:

c. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, falsework, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required;

d. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

e. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

f. allow for partial utilization of the Work by Owner;

g. include testing and startup; and

h. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

2. Contractor shall be responsible for any deductible or self-insured retention.

3. The policies of insurance required to be purchased and maintained by Contractor in accordance with this Paragraph SC-5.06.A shall comply with the requirements of paragraph 5.06.C of the General Conditions.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty (30) days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.07 Waiver of Rights

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

   1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

   2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 Receipt and Application of Insurance Proceeds

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 Acceptance of Bonds and Insurance; Option to Replace

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Part 5 on the basis of nonconformance with the Contract Documents, the objecting party shall so notify the other party in writing within ten (10) days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 Partial Utilization, Acknowledgment of Property Insurer

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

PART 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 Supervision and Superintendence

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 Labor; Working Hours

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 Services, Materials, and Equipment

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, startup, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 Progress Schedule

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Part 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 Substitutes and "Or-Equals"

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. “Or-Equal” Items: If in Engineer’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

    a. in the exercise of reasonable judgment Engineer determines that:

        1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

        2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

        3) it has a proven record of performance and availability of responsive service; and

    b. Contractor certifies that, if approved and incorporated into the Work:

        1) there will be no increase in cost to the Owner or increase in Contract Times, and

        2 it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

    a. If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

    b Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

    c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

    d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

        1) shall certify that the proposed substitute item will:

            a) perform adequately the functions and achieve the results called for by the general design,

            b) be similar in substance to that specified, and

            c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. Engineer's Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or-equal." Engineer will advise Contractor in writing of any negative determination.

D. Special Guarantee: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. Engineer's Cost Reimbursement: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. The identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

   1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

   2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer,, and all other individuals or entities to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

H. Owner or Engineer may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

6.07 Patent Fees and Royalties

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 Permits

A. Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 Laws and Regulations

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 Taxes

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 Record Documents

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

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

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 Safety Representative

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 Hazard Communication Programs

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 Emergencies

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 Shop Drawings and Samples

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

   1. Shop Drawings

      a. Submit number of copies specified in the General Requirements.

      b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

   2. Samples: Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

      a. Submit number of Samples specified in the Specifications.

      b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

   a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

   b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

   c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

   d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three (3) submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.

G. In the event that Contractor requests a substitution for a previously approved item, Contractor shall reimburse Owner for Engineer's charges for such time unless the need for such substitution is beyond the control of Contractor.

6.18 Continuing the Work

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 Contractor's General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

D. The Contractor's General Warranty and Guarantee shall be for a period of one (1) year after work has been accepted and final payment made to the Contractor. In the case of Water and Wastewater lines, the warranty period will start after acceptance of these lines into the utility provider's system for ownership, operation, and maintenance. The Contractor accepts the transference of all warranties and guarantees to the utility provider owning and operating the new lines.

6.20 Indemnification

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 Delegation of Professional Design Services

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, 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 Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

PART 7 - OTHER WORK AT THE SITE

7.01 Related Work at Site

A. Owner may perform other work related to the Project at the Site with Owner's employees or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Part 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 Coordination

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Owner shall have sole authority and responsibility for such coordination.

7.03 Legal Relationships

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

7.04 Claims Between Contractors

A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law.

B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Engineer, the construction coordinator and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Engineer, Engineer's Consultants, or the construction coordinator to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or the construction coordinator or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, Engineer, or the construction coordinator on account of any such damage or Claim.

C. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Part 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.

PART 8 - OWNER'S RESPONSIBILITIES

8.01 Communications to Contractor

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 Replacement of Engineer

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 Furnish Data

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 Pay When Due

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 Lands and Easements; Reports and Tests

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 Insurance

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Part 5.

8.07 Change Orders

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 Inspections, Tests, and Approvals

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 Limitations on Owner's Responsibilities

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 Undisclosed Hazardous Environmental Condition

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 Evidence of Financial Arrangements

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth.

B. On request of Contractor prior to the execution of any Change Order involving a significant increase in the Contract Price, Owner shall furnish to Contractor reasonable evidence that adequate financial arrangements have been made by Owner to enable Owner to fulfill the increased financial obligations to be undertaken by Owner as a result of such Change Order.

PART 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 Owner's Representative

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 Visits to Site

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 Project Representative

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in Paragraph 9.09.

9.04 Authorized Variations in Work

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 Rejecting Defective Work

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 Shop Drawings, Change Orders and Payments

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Parts 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Part 14.

9.07 Determinations for Unit Price Work

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 Decisions on Requirements of Contract Documents and Acceptability of Work

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 Limitations on Engineer's Authority and Responsibilities

A. Neither Engineer's authority or responsibility under this Part 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

PART 10 - CHANGES IN THE WORK; CLAIMS

10.01 Authorized Changes in the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 Unauthorized Changes in the Work

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 Execution of Change Orders

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 Notification to Surety

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 Claims

A. Engineer's Decision Required: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. Notice: Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. Engineer's Action: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Part 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

PART 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 Cost of the Work

A. Costs Included: The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

    g. The cost of utilities, fuel, and sanitary facilities at the Site.

    h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

    i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. Costs Excluded: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. Contractor's Fee: When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

PART 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05. Final approval of all change orders rests with the owner.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. Contractor's Fee: The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 Change of Contract Times

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05. Final approval of all change orders rests with the owner.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Part 12.

12.03 Delays

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Part 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Part 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times , or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

F. All claims for delays shall be submitted within thirty (30) days of the event causing the delay.

PART 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Part 13.

13.02 Access to Work

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 Uncovering Work

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 Owner May Stop the Work

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 Correction or Removal of Defective Work

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 Correction Period

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 Acceptance of Defective Work

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 Owner May Correct Defective Work

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven (7) days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

PART 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. The date of the pay application must be the last day of the month. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications

1. Engineer will, within fifteen (15) days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

   b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

   a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

   b. the Contract Price has been reduced by Change Orders;

   c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

   d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Fifteen (15) days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

   a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

   b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   c. there are other items entitling Owner to a set-off against the amount recommended; or

   d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven (7) days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 Partial Utilization

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 Final Payment

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten (10) days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty (30) days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

14.08 Final Completion Delayed

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 Waiver of Claims

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

PART 15 - SUSPENSION OF WORK AND TERMINATION

15.01 Owner May Suspend Work

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 Owner May Terminate for Cause

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven (7) days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven (7) days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 Owner May Terminate For Convenience

A. Upon seven (7) days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 Contractor May Stop Work or Terminate

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven (7) days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

PART 16 - DISPUTE RESOLUTION

16.01 Methods and Procedures

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

PART 17 - MISCELLANEOUS

17.01 Giving Notice

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 Computation of Times

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 Cumulative Remedies

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 Controlling Law

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 Headings

A. Part and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SECTION 00940

WORK CHANGE DIRECTIVE

No. _____

Date of Issuance: _____ Effective Date: _____

Project: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**	Owner: **Florence County**	Owner's Contract No.:
Contract: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**		Date of Contract:
Contractor:		Engineer's Project No.: **15103-0021**

You are directed to proceed promptly with the following change(s):

Item No.	Description

Attachments (list documents supporting change):

_____

_____

Purpose for Work Change Directive:

☐ Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

☐ Nonagreement on pricing of proposed change.

☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price $ _____ (increase/decrease) Contract Time _____ (increase/decrease)
days

If the change involves an increase, the estimated amounts are not to be exceeded without further authorization.

Recommended for Approval by Engineer: Kyle M. Clampitt, P.E.	Date
Authorized for Owner by: Mr. Patrick Fletcher, Procurement Director	Date
Accepted for Contractor by:	Date
Approved by Funding Agency (if applicable):	Date:

SECTION 00941

CHANGE ORDER

No. _____

Date of Issuance: _____ Effective Date: _____

Project: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**	Owner: **Florence County**	Owner's Contract No.:
Contract: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**		Date of Contract:
Contractor:		Engineer's Project No.: **15103-0021**

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments: (List documents supporting change):

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIMES:**
Original Contract Price:	Original Contract Times: ☐ Working days ☐ Calendar days
	Substantial completion (days or date): _____
$_____	Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No._____ to No._____:	[Increase] [Decrease] from previously approved Change Orders No._____ to No._____:
	Substantial completion (days): _____
$_____	Ready for final payment (days): _____
Contract Price prior to this Change Order:	Contract Times prior to this Change Order:
	Substantial completion (days or date): _____
$_____	Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order:	[Increase] [Decrease] of this Change Order:
	Substantial completion (days or date): _____
$_____	Ready for final payment (days or date): _____
Contract Price incorporating this Change Order:	Contract Times with all approved Change Orders:
	Substantial completion (days or date): _____
$_____	Ready for final payment (days or date): _____

RECOMMENDED:	APPROVED:	APPROVED:
By: _____	By: _____	By: _____
Contractor (Authorized Signature)	Owner: Mr. Patrick Fletcher, Procurement Directors	Engineer: Kyle M. Clampitt, P.E.
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable): _____ Date: _____

SECTION 00942

FIELD ORDER

No. _____

Date of Issuance: _____ Effective Date: _____

Project: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**	Owner: **Florence County**	Owner's Contract No.:
Contract: **Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina**		Date of Contract:
Contractor:		Engineer's Project No.: **15103-0021**

Attention:
You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.05A., for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference: _____ _____
(Specification Section(s)) (Drawing(s) / Detail(s))

Description:

Attachments:

Engineer: Kyle M. Clampitt, P.E.

Receipt Acknowledged by (Contractor):	Date:

Copy to Owner

SECTION 00950

CONTRACTOR/SUBCONTRACTOR QUALIFICATIONS

PART 1 - GENERAL

1.01 The following information and completed forms may be requested by the Owner of the three (3) lowest bidders. The request will be made the day of the Bid Opening or within five (5) days following the Bid Opening. If requested, this data must be submitted to the Engineer or Owner within five (5) days of the request. Failure to provide the data in this section, upon request, will subject bidder to disqualification.

1.02 DESCRIPTION

A. Information provided will be used by the Engineer or Owner to determine the competency and ability of the Contractor and/or Subcontractor to perform the scheduled work in a manner that is satisfactory to the Engineer or Owner. The Engineer or Owner's decision shall be final.

B. Any Subcontractor being used by the General Contractor, whose portion of the project exceeds 5% of the total bid price amount, will be required to provide the same information as the General Contractor.

C. The Contractor and Subcontractor shall include with this section a detailed financial statement indicating the Contractor's or Subcontractor's financial resources. The information on that statement shall be certified by a Certified Public Accountant and shall be submitted on the Associated General Contractor's of America form "Standard Questionnaires and Financial Statement for Bidders".

D. The Contractor and Subcontractor shall certify by attaching his signature to this Section as provided that all information contained herein is complete and all statements and answers are accurate and true. Providing misinformation, incomplete information, inaccurate information, or failure to certify the information, will subject bidder to disqualification.

1.03 QUALIFICATIONS

A. Complete the following for General Contractor and any Subcontractors (attach additional sheets as required):

1. Name: _____
2. Address: _____
3. City, State, Zip: _____
4. Principle: _____

B. Number of years the company has been is business:

C. List and describe at least five (5) projects that have been completed, that are similar in size and type, and that has been completed within the last ten (10) years:

1. _____

   _____

2. _____

   _____

3. _____

_____

4. _____

_____

5. _____

_____

D. For the projects listed above provide the following:

1. Project Owner: _____
   Contact Name and Title: _____
   Telephone Number: _____

2. Project Owner: _____
   Contact Name and Title: _____
   Telephone Number: _____

3. Project Owner: _____
   Contact Name and Title: _____
   Telephone Number: _____

4. Project Owner: _____
   Contact Name and Title: _____
   Telephone Number: _____

5. Project Owner: _____
   Contact Name and Title: _____
   Telephone Number: _____

E. For each of the projects listed in Items C & D provide the following:

1. Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

2. Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

3. Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

4. Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

5. Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

F. Provide the following for any portion of the work that is being subcontracted (5% or more of the Bid Amount):

1. Name of Subcontractor: _____
   Address: _____
   Telephone Number: _____
   Work being Completed: _____

2. Name of Subcontractor: _____
   Address City/State/Zip: _____
   Telephone Number: _____
   Work being Completed: _____

3. Name of Subcontractor: _____
   Address City/State/Zip: _____
   Telephone Number: _____
   Work being Completed: _____

4. Name of Subcontractor: _____
   Address City/State/Zip: _____
   Telephone Number: _____
   Work being Completed: _____

5. Name of Subcontractor: _____
   Address City/State/Zip: _____
   Telephone Number: _____
   Work being Completed: _____

G. Provide a list of equipment that is owned by the Contractor and is available for this project.

_____

_____

H. Provide a list of equipment that will be purchased, leased or rented for this project.

_____

_____

I. Provide a list of the superintendent(s) or others that will be in charge of this project (Provide resumes and qualifications):

_____

_____

_____

_____

J. Provide the following for current projects being completed:

1. Project Name: _____
   Owner: _____
   Current Status: _____
   Estimated Schedule of Completion: _____

2. Project Name: _____
   Owner: _____
   Current Status: _____
   Estimated Schedule of Completion: _____

3. Project Name: _____
   Owner: _____
   Current Status: _____
   Estimated Schedule of Completion: _____

4. Project Name: _____
   Owner: _____
   Current Status: _____
   Estimated Schedule of Completion: _____

5. Project Name: _____
   Owner: _____
   Current Status: _____
   Estimated Schedule of Completion: _____

K. Provide a list of projects that has been completed with the Owner over the past fifteen (15) years:

1. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

2. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

3. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

4. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

5. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

L. Provide a list of projects that Bid with the Owner over the past fifteen (15) years:

1. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

2. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

3. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

4. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

5. Project Name: _____
   Contact Name and Title: _____
   Telephone Number: _____

M. Provide a list of projects completed with the Engineer over the past fifteen (15) years:

1. Project Name: _____
   Project Engineer: _____
   Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

2. Project Name: _____
   Project Engineer: _____
   Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

3. Project Name: _____
   Project Engineer: _____
   Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

4. Project Name: _____
   Project Engineer: _____
   Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

5. Project Name: _____
   Project Engineer: _____
   Original Bid Amount: _____
   Final Construction Cost: _____
   Contract Period: _____
   Actual Contract Period: _____
   Explanation: _____

N. Provide a list of projects involved with litigation, arbitration and/or mediation over the past twenty (20) years:

1. Project Name: _____
   Project Owner: _____
   Project Engineer: _____
   Date: _____
   Explanation: _____

2. Project Name: _____
   Project Owner: _____
   Project Engineer: _____
   Date: _____
   Explanation: _____

3. Project Name: _____
   Project Owner: _____
   Project Engineer: _____
   Date: _____
   Explanation: _____

4. Project Name: _____
   Project Owner: _____
   Project Engineer: _____
   Date: _____
   Explanation: _____

5. Project Name: _____
   Project Owner: _____
   Project Engineer: _____
   Date: _____
   Explanation: _____

O. Attach a rate schedule associated with equipment that includes labor, overhead and profit.
   _Rate Schedule Attached.

P. Additional information if Necessary.

   1. _____

1.04 I HEREBY CERTIFY that as a duly authorized representative of _____ _____(bidder), the information provided is to the best of my knowledge accurate and that failure to provide accurate information will result in disqualification of my bid.

_____

Signature

_____

Name (Please Print)

_____

Title

_____

Date

_____

Notary Public for South Carolina

My Commission Expires: _____

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SECTION 00951

DRAWINGS INDEX

Site Improvements To The Approximately Two (2) Acre Greenwood Convenience Center In Florence County, South Carolina

Project No. 15103-0021, Drawing No. 01,896-D16, Dated January 2015.

TITLE	SHEET NO.
Cover	
Existing Conditions And General Notes	C1
Demolition, Clearing and Grubbing Plan	C2
Site Plan	C3
Grading and Storm Drainage Plan	C4
Erosion and Sediment Control Plan	C5
Storm Drainage Profiles	C6
Site Details (Sheet 1 of 2)	C7
Site Details (Sheet 2 of 2)	C8
Erosion and Sediment Control Details (Sheet 1 of 2)	C9
Erosion and Sediment Control Details (Sheet 2 of 2)	C10

SECTION 01300

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electronic document submittal service.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Construction progress schedule.

F. Progress photographs.

G. Coordination drawings.

H. Submittals for review, information, and project closeout.

I. Number of copies of submittals.

J. Submittal procedures.

1.02 RELATED REQUIREMENTS

A. Section 01700 – Execution and Closeout Requirements

B. Section 01780 - Closeout Submittals

C. Sections throughout these specifications may include other submittals that may be required for construction.

1.03 PROJECT COORDINATION

A. Project Coordinator: Construction Manager.

B. During construction, coordinate use of site and facilities through the Project Coordinator.

C. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.

D. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.

E. Coordinate field engineering and layout work under instructions of the Project Coordinator.

F. Make the following types of submittals to Engineer through the Project Coordinator:

1. Requests for interpretation.
2. Requests for substitution.
3. Shop drawings, product data, and samples.
4. Test and inspection reports.
5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Engineer will schedule a meeting within thirty (30) days after the Owner has determined the low bidder and may be held prior to issuance of the Notice to Proceed when required by regulatory

agencies having jurisdiction. In any event, the Conference will be held prior to actual start of construction.

B. For the individuals designated by the Contractor, his subcontractors and suppliers attending the Preconstruction Conference, provide required authority to commit the entities they represent to solutions agreed upon in the meeting.

C. Advise the Engineer at least twenty-hours (24) in advance of the meeting to add items to the agenda.

D. Attendance Required:
   1. Owner.
   2. Engineer.
   3. South Carolina Department of Transportation
   4. South Carolina Department of Health and Environmental Control
   5. Contractor

E. Agenda:
   1. Arrangement of Contractor's forces and personnel and those of subcontractors, materials suppliers and the Engineer.
   2. Channels and procedures for communication.
   3. Submission of schedule of values, and progress schedule.
   4. Designation of personnel representing the parties to Contractor, Owner and Engineer.
   5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   6. Scheduling.
   7. Scheduling activities of a Geotechnical Engineer.
   8. Rules and regulations governing performance of the Work.
   9. Security, quality control, housekeeping and related matters.

F. Preconstruction Meeting minutes will be recorded and distributed within ten (10) days after meeting to participants, with three (3) copies to the Contractor and the required number of copies to the Owner, and those affected by decisions being made.

3.02 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum two (2) week intervals.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings. Contractor must advise the Engineer within forty-eight (48) hours of advance notice of the meeting to add items to the agenda.

C. The Contractor's relations with his subcontractors and material suppliers, and discussions with regards to this items, are the Contractor's responsibility and normally not part of the project meeting agenda.

D. For the individuals designated by the Contractor to attend and participate in the project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

E. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.

F. Meeting Schedule:
   1. Project Meetings will be held Bi-weekly or, at a minimum, monthly.
   2. Coordinate as necessary to establish mutually acceptable schedule for meetings.

G. Meeting Location: The Engineer will establish the meeting location, and where possible the meetings will be held at the project site or a location near the project site.

H. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.

3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

I. Project Meeting minutes will be recorded and distributed within ten (10) days after meeting to participants, with three (3) copies to the Contractor and the required number of copies to the Owner, and those affected by decisions made.

J. Revisions to Meeting Minutes:
1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, the minutes will be accepted as properly stating the activities and decisions of the meeting.
2. Individuals challenging published minutes shall reproduce and distribute copies of the challenge for review by all parties affected.
3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

3.03 CONSTRUCTION PROGRESS SCHEDULE

A. Within fourteen (14) days after the Preconstruction Meeting, submit preliminary schedule defining planned operations for the first sixty (60) days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within ten (10) days.

C. Within thirty (30) days after review of preliminary schedule, submit draft of proposed complete schedule for review.

D. Include written certification that major contractors have reviewed and accepted proposed schedule.

E. Within ten (10) days after joint review, submit complete schedule.

F. Submit updated schedule with each Application for Payment.

3.04 PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than three (3) days prior to submission of application for payment.

B. Submit new photographs at least once a month, within three (3) days after exposure.

C. Maintain one (1) set of all photographs at project site for reference; same copies as submitted, identified as such.

D. Photography Type: Digital; electronic files.
1. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Engineer.

E. In addition to periodic, recurring views, take photographs of each of the following events:
1. Completion of site clearing.
a. Excavations in progress.
b. Undercut of Non-Jurisdictional Wetlands area and compaction of backfill in progress and upon completion.
c. Installation of swales in progress and upon completion.
d. Final completion/grassing of site, minimum of ten (10) photos.

2. Views:
    a. Provide non-aerial photographs from four cardinal views at each specified time, until Date of Substantial Completion.
    b. Consult with Engineer for instructions on views required.
    c. Provide factual presentation.
    d. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
1. Delivery Medium: Via email.
2. File Naming: Include project identification, date and time of view, and view identification.
3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
4. Photo CD(s): Provide 1 copy including all photos cumulative to date and PDF file(s), with files organized in separate folders by submittal date.
5. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

3.05 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Shop drawings.
3. Samples for selection.
4. Samples for verification.

B. Submit to Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

C. Samples
1. Provide sample or samples identical to the precise article proposed to be provided. Identify as described under "Identification of submittals" below.
2. Number of samples required:
    a. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus one which will be retained by the Engineer.
    b. By pre-arrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the work at a location agreed upon by the Engineer.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below.

3.06 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
1. Design data.
2. Certificates.
3. Test reports.
4. Inspection reports.
5. Manufacturer's instructions and literature.
6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Engineer's knowledge as contract administrator or for Owner.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
1. Project record documents.
2. Operation and maintenance data.
3. Warranties and Bonds.
4. Evidence of payment and release to liens per the General Conditions.

5. Other types as indicated.

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

3.08 NUMBER OF COPIES OF SUBMITTALS

A. Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

B. Documents for Review:
   1. Shop Drawings
      a. Scale and measurements: Make shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
      b. Large prints (11-inches x 17-inches or larger):
         1) Submit shop drawings in the form of white copies.
         2) Blueprints will not be acceptable.
      c. Manufacturer's literature:
         1) Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.
         2) Submit the number of copies which are required to be returned, plus three (3) copies which will be retained by the Engineer.
      d. Do not begin fabrication of equipment or materials prior to Engineer's approval of shop drawings.
   2. Small Size Sheets, Not Larger than 8-1/2 x 11 inches: Submit one copy; the Contractor shall make his own copies from original returned by the Engineer after making his own file copy.
   3. Small Size Sheets, Not Larger than 8-1/2 x 11 inches: Submit the number of copies that Contractor requires, plus 3 that will be retained by Engineer.

C. Documents for Information: Submit three (3) copies.

D. Extra Copies at Project Closeout: See Section 01780.

E. Documents for Project Closeout: Make one (1) reproduction of submittal originally reviewed. Submit one (1) extra of submittals for information.

F. Samples: Submit the number specified in individual specification sections; two (2) of which will be retained by Engineer.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 SUBMITTAL PROCEDURES

A. Transmit each submittal with an approved form that stipulates that the items submitted complies or does not comply with the full extent of the specifications. The Cover Letter must also include an explanation of why the items submitted are considered equal to the items specified. Failure to submit a Cover Letter will result in a rejection of the submittal.

B. Timing of Submittals:
   1. Within fifteen (15) calendar days after the Contractor has received the Owner's notice to proceed, submit:
      a. Schedule for submittals including specification section, type of submittal and submittal date.
      b. Construction schedule.
      c. Schedule of partial payment requests.
   2. Make submittals of shop drawings, samples, substitution requests and other items in accordance with the provisions of this Section.

C. Quality Assurance:
   1. Coordination of submittals:

a. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
b. Verify that each item and the submittal for it conform in all respects with the specified requirements.
c. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.

2. The following products do not require further approval except for interface within the Work and where otherwise indicated.
   a. Products specified by reference to standard specifications such as ASTM, AWWA, and similar standards.
   b. Products specified by manufacturer's name and catalog model number.
3. "Or equal":
   a. Where the phrase "or equal" occurs in the Contract Documents, do not assume that the materials, equipment or methods will be considered as equal unless the item has been specifically so approved for this Work by the Engineer.
   b. The decision of the Engineer shall be final.
4. The Engineer shall assume that no shop drawing or related submittal comprises a variation unless the Contractor advises the Engineer otherwise in writing.

D. Sequentially number submittal in the Cover Letter. Revise submittals with original number and a sequential alphabetic suffix.

E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

F. Before submitting a shop drawing or any related material, Contractor shall:
1. Review each such submission for conformance with the means, methods, techniques, sequences, and operations of construction, and safety precautions and programs incidental thereto, all of which are the sole responsibility of Contractor.
2. Approve each such submission before submitting it.
3. Stamp each such submission before submitting it.

G. Shop drawings and related materials shall be returned with comments provided that each submission has been specified and is stamped by the Contractor.

H. Shop drawings or material not specified or which have not been approved by the Contractor shall be returned without comment.

I. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. The following is an illustration of the stamp to be used on all shop drawings:

"This Shop Drawing has been reviewed by [Name of Contractor] and approved in accordance with the ways, means, methods, techniques, sequences and procedures associated with the project construction. [Name of Contractor] has approved these Shop Drawings in accordance with safety precautions and programs incidental thereto, and warrants that these Shop Drawings comply with the Contract Documents and includes no variations from the specifications."

Signature_____

Name and Title (Please Print)_____

Date_____

J. Identification of Submittals
    1. Consecutively number all submittals.
        a. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
        b. On resubmittals, cite the original submittal number for reference.
    2. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
    3. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
    4. Maintain an accurate submittal log for the duration of the work, showing current status of all submittals at all times. Make the submittal log available to the Engineer for his review upon request.

K. Consecutively number all submittals.
    1. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
    2. On resubmittals, cite the original submittal number for reference.

L. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.

M. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.

N. Maintain an accurate submittal log for the duration of the work, showing current status of all submittals at all times. Make the submittal log available to the Engineer for his review upon request.

O. Unrequired submittals will not be reviewed by the Engineer.

P. Submittals required by the Contractor of his subcontractors, such as drawings, setting diagrams or similar information needed to coordinate the construction, shall remain between the Contractor and his subcontractors and these submittals will not be reviewed by the Engineer.

Q. Grouping of Submittals
    1. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
        a. Partial submittals may be rejected as not complying with the provisions of the Contract.
        b. The Contractor may be held liable for delays so occasioned.

R. Timing of Submittals
    1. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

S. Resubmittal Schedule
    1. For submittals marked "Furnish as Corrected" by the Engineer, resubmittal shall be within fifteen (15) days of the review date shown on the Engineer's shop drawing review stamp.
    2. For submittals marked "Revise and Resubmit", "Submit Specified Item", or "Rejected", resubmittal shall be within fifteen (15) days of the review date shown on the Engineer's shop drawing review stamp.

T. Engineer's Review
    1. Review by the Engineer does not relieve the Contractor from responsibility for errors which may exist in the submitted data.
    2. Revisions:
        a. Make revisions required by the Engineer.
            1) If the Contractor considers any required revision to be a change, he shall so notify the Engineer as provided for in the General Conditions.
            2) Make only those revisions directed or approved by the Engineer.

3) Submittals which have been reviewed and returned to the Contractor marked "Revise and Resubmit" or "Rejected" and which are resubmitted and not in an approved state, will not be reviewed a third time unless payment for the third and any subsequent review is by the Contractor. The engineering costs for review shall be equal to the Engineer's charges to the Owner under the terms of the Engineering Agreement with the Owner.

U. Deliver submittals to Engineer at PO Box 8147 Columbia, SC 29202-8147.

V. Schedule submittals to expedite the Project, and coordinate submission of related items.

W. For each submittal for review, allow twenty-five (25) working days excluding delivery time to and from the Contractor.

X. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

Y. Provide space for Contractor and Engineer review stamps.

Z. When revised for resubmission, identify all changes made since previous submission.

AA. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

AB. Submittals not requested will not be recognized or processed.

END OF SECTION

SECTION 01400

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.

B. Mock-ups.

C. Control of installation.

D. Tolerances.

E. Testing and inspection services.

F. Manufacturers' field services.

G. Cooperate with the Owner's selected testing agency and all others responsible for testing and inspecting the work.

H. Provide such other testing and inspecting as are specified to be furnished by the Contractor in this Section and/or elsewhere in the Contract Documents.

1.02 RELATED REQUIREMENTS

A. Section 01300 - Administrative Requirements

B. Section 01600 - Product Requirements

C. Requirements for testing may be described in various Sections of these specifications.

D. Where no testing requirements are described, but the Owner decides that testing is required, the Owner may require such testing to be performed under current pertinent standards for testing. Payment for such testing will be made as described in this Section.

1.03 WORK NOT INCLUDED

A. Selection of testing laboratory: The Owner will select a prequalified independent testing laboratory.

B. Payment for initial testing: The Owner will pay for all initial services of the testing laboratory as further described in Article 2.1 of this Section.

C. Tests at point of manufacture as specified in other Sections of these documents are to be made with all costs borne by the Contractor.

1.04 REFERENCE STANDARDS

A. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2013a.

B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2012.

C. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.

D. ASTM E329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2011.

E. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2009.

1.05 SUBMITTALS

A. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
   2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

B. Design Data: Submit for Engineer's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

C. Test Reports: After each test/inspection, promptly submit three (3) copies of report to Engineer and to Contractor.
   1. Include:
      a. Date issued.
      b. Project title and number.
      c. Name of inspector.
      d. Date and time of sampling or inspection.
      e. Identification of product and specifications section.
      f. Location in the Project.
      g. Type of test/inspection.
      h. Date of test/inspection.
      i. Results of test/inspection.
      j. Conformance with Contract Documents.
      k. When requested by Engineer, provide interpretation of results.
   2. Test report submittals are for Engineer's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Engineer, in quantities specified for Product Data.
   1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
   2. Certificates may be recent or previous test results on material or product, but must be acceptable to Engineer.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Engineer's benefit as contract administrator or for Owner.
   1. Submit report in duplicate within 30 days of observation to Engineer for information.
   2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.06 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.07 QUALITY ASSURANCE

A. The testing laboratory will be qualified to the Owner's approval in accordance with ASTM E 329.

B. Testing, when required, will be in accordance with all pertinent codes and regulations, and with selected standards of the American Society for Testing and Materials.

1.08 PRODUCT HANDLING

A. Comply with pertient provisions of Section 01300.

B. Promptly process and distribute required copies of test reports and related instructions to assure necessary retesting and replacement of materials with the least possible delay in progress of the work.

1.09 TESTING AND INSPECTION AGENCIES

A. Employment and payment for services of an independent testing agency to perform other specified testing will be per the contract agreement between the Owner and Design-Builder.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS

2.01 PAYMENT FOR TESTING

A. Testing Services:
   1. The Contractor will pay for all testing services required by the contract documents and manufacturers recommendations.
   2. When initial tests indicate non-compliance with the Contract Documents, any all retesting and consulting required to provide compliance with the Contract Documents will the responsibility of the contractor at no additional costs to the Owner.
   3. Retesting: When initial tests indicate non-compliance with the Contract Documents, subsequent re-testing occasioned by the non-compliance shall be performed by the same testing agency.

2.02 CODE COMPLIANCE TESTING

A. Inspections and tests required by codes or ordinances, or by a plan approval authority, and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

2.03 CONTRACTOR'S CONVENIENCE TESTING

A. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 CONTRACTOR TESTING COORDINATION

A. Cooperation with Testing Laboratory:
   1. Representatives of the testing laboratory shall have access to the work at all times and at all locations where the work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

B. Taking Specimens:
   1. All specimens and samples for testing, and deliveries to laboratory, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

3.03 SCHEDULES FOR TESTING

A. Establishing schedule:
   1. By advance discussion with the testing laboratory selected in accordance with the GMAX contract agreement between the Owner and Design-Builder, determine the time required for the laboratory to perform its tests and to issue each of its findings.
   2. Provide all required time within the construction schedule

B. Revising schedule: When changes of construction schedule are necessary during construction, coordinate all such changes with the testing laboratory as required.

C. Adherence to schedule: When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the work, all extra charges for testing attributable to the delay may be back charged to the Contractor and shall not be borne by the Owner.

3.04 MOCK-UPS

A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where mock-up has been accepted by Engineer and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.05 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.06 TESTING AND INSPECTION

A. See individual specification sections for testing required.

B. Testing Agency Duties:

1. Test samples of mixes submitted by Contractor.
2. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or products.
6. Perform additional tests and inspections required by Engineer.
7. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency may not approve or accept any portion of the Work.
3. Agency may not assume any duties of Contractor.
4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
3. Provide incidental labor and facilities:
   a. To provide access to Work to be tested/inspected.
   b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
   c. To facilitate tests/inspections.
   d. To provide storage and curing of test samples.
4. Notify Engineer and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Engineer.

F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

3.07 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations.
1. Observer subject to approval of Engineer.
2. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.08 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

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

END OF SECTION

SECTION 01560

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Performance bond.

E. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 RELATED REQUIREMENTS

A. Section 02110 - Clearing and Grubbing

B. Section 02210 - Grading

C. Section 02271 - Riprap

D. Section 02930 - Grassing

1.03 REFERENCE STANDARDS

A. ASTM D4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus; 2007.

B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2009).

C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2011.

D. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2008.

E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2012.

F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2002 (Reapproved 2009).

G. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; current edition.

H. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; Federal Highway Administration; 1995.

I. USDA TR-55 - Urban Hydrology for Small Watersheds; USDA Natural Resources Conservation Service; 2009.

1.04 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of U.S. Environmental Protection Agency for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), Phases I, II and III, under requirements for the 2012 Construction General Permit (CGP), whether the project is required by law to comply or not.

B. Also comply with all more stringent requirements of State of South Carolina Erosion and Sedimentation Control Manual.

C. Comply with all requirements of SCDHEC and Fairfield County for erosion and sedimentation control, even though this project is not required by law to comply.

D. Best Management Practices Standard: Federal Highway Administration Best Management Practices for Erosion and Sediment Control.

E. Runoff Calculation Standard for Urban Areas: USDA NRCS TR-55, Urban Hydrology for Small Watersheds.

F. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.

G. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
   1. Owner will obtain permits and pay for securities required by authority having jurisdiction.
   2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.

H. Provide to Owner a Performance Bond covering erosion and sedimentation preventive measures only, in an amount equal to 100 percent of the cost of erosion and sedimentation control work.

I. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

J. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
   1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
   2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in ten (10) years.

K. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

L. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

M. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment as necessary.

N. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

O. Open Water: Prevent standing water that could become stagnant.

P. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mulch: Use one of the following:
   1. Wood waste, chips, or bark.
   2. Erosion control matting.

B. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
   1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
   2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491.
   3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355 after 500 hours exposure.
   4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632.
   5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632.
   6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D4533.
   7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
   8. Manufacturers:
      a. North American Green (NAG)
      b. Profile Projects

C. Silt Fence Posts:
   1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot, minimum 5 feet long.

D. Riprap: See Section 02271.

E. Grassing: See Section 02930.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. Width: As required; 20 feet, minimum.
   2. Length: 100 feet, minimum.
   3. Provide at each construction entrance from public right-of-way.
   4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fences.
   1. Provide linear sediment barriers:
      a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
      b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
      c. Along the toe of cut slopes and fill slopes.

d. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart.
e. Across the entrances to culverts that receive runoff from disturbed areas.
f. In areas as specified on construction plans.

2. Space sediment barriers with the following maximum slope length upslope from barrier:
a. Slope of Less Than 2 Percent: 100 feet..
b. Slope Between 2 and 5 Percent: 75 feet.
c. Slope Between 5 and 10 Percent: 50 feet.
d. Slope Between 10 and 20 Percent: 25 feet.
e. Slope Over 20 Percent: 15 feet.
f. In areas as specified on construction plans.

D. Soil Stockpiles: Protect using one of the following measures:
1. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

E. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.

F. Temporary Grassing: Use where temporary vegetated cover is required.

3.04 INSTALLATION

A. Construction Entrance:
1. Excavate minimum of six (6) inches.
2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
3. Place and compact at least six (6) inches of 1.5 to 3.5 inch diameter stone.
4. Place and compact at least two (2) inches of #57 stone.

B. Silt Fences:
1. Store and handle fabric in accordance with ASTM D4873.
2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
5. Install with top of fabric at nominal height and embedment as specified.
6. Embed bottom of fabric in a trench on the upslope side of fence, with six (6) inches of fabric laid flat on bottom of trench facing upslope; backfill trench and compact.
7. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
8. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
9. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

C. Mulching Over Large Areas:
1. Dry Straw and Hay: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.
2. Wood Waste: Apply 6 to 9 tons per acre.
3. Erosion Control Matting: Comply with manufacturer's instructions.

D. Mulching Over Small and Medium Areas:
1. Wood Waste: Apply 2 to 3 inches depth.

2. Erosion Control Matting: Comply with manufacturer's instructions and Construction Drawings.

E. Temporary Grassing:
   1. When hydraulic seeder is used, seedbed preparation is not required.
   2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual grassing is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
   3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
   4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
   5. Incorporate fertilizer into soil before grassing.
   6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep deep.
   7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
   8. Repeat irrigation as required until grass is established.

3.05 MAINTENANCE

A. Observe preventive measures once per every seven (7) days, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:
   1. Promptly replace fabric that deteriorates unless need for fence has passed.
   2. Remove silt deposits that exceed one-third of the height of the fence.
   3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Clean out temporary sediment control structures weekly and relocate soil on site.

E. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

3.07 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 01600
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Transportation, handling, storage and protection.

C. Product option requirements.

D. Substitution limitations and procedures.

E. Procedures for Owner-supplied products.

F. Maintenance materials, including extra materials, spare parts, tools, and software.

G. Protect products scheduled for use in the work by means including, but not necessarily limited to, those described in this Section.

1.02 RELATED REQUIREMENTS

A. Section 01400 - Quality Requirements.

B. Section 01710 - Construction Waste Management and Disposal

C. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 1 of these specifications.

D. Additional procedures also may be prescribed in other Sections of these specifications.

1.03 REFERENCE STANDARDS

A. 16 CFR 260 - Guides for the Use of Environmental Marketing Claims; Federal Trade Commission; current edition.

B. CAN/CSA Z809 - National Standard for Sustainable Forest Management; CSA International Inc.; 2008.

1.04 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within fifteen (15) days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1.05 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.06 MANUFACTURER'S RECOMMENTDATIONS

A. Except as otherwise approved by the Engineer, determine and comply with manufacturer's recommendations on product handling, storage and protection.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Do not use products having any of the following characteristics:
   1. Made outside the United States, its territories, Canada, or Mexico.
   2. Made using or containing CFC's or HCFC's.
   3. Made of wood from newly cut old growth timber.

C. Where all other criteria are met, Contractor shall give preference to products that:
   1. Are extracted, harvested, and/or manufactured closer to the location of the project.
   2. Have longer documented life span under normal use.
   3. Result in less construction waste.

D. Provide interchangeable components of the same manufacture for components being replaced.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Engineer will consider requests for substitutions only within 15 days after date of Agreement.

C. Substitutions will not be considered when a product becomes unavailable through no fault of the Contractor.

D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

E. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension that may subsequently become apparent.
5. Will reimburse Owner and Engineer for review or redesign services associated with re-approval by authorities.

F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

G. Substitution Submittal Procedure:
1. Submit three (3) copies of request for substitution for consideration. Limit each request to one proposed substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
3. The Engineer will notify Contractor in writing of decision to accept or reject request.

3.02 PACKAGING

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
1. Maintain packaged materials with seals unbroken and labels intact until time of use.
2. Promptly remove damaged material and unsuitable items from the job site and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

B. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to manufacturer, grade, quality and other pertinent information.

3.03 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

L. Partial payments under the Contract will not relieve the Contractor from responsibility.
   1. When materials and work at the site that have been partially paid for are not adequately protected by the Contractor, such materials will be protected by the Owner at the expense of the Contractor and no furthur partial payment thereon will be made.

M. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

N. Electrical and control equipment:
   1. Store in a dry area protected from dust and humidity.
   2. Equipment can be protected by a weatherproof cover if shipped to the site no more than two (2) weeks prior to installation and energization.

3.05 REPAIRS AND REPLACEMENTS

A. In the event of damage, promptly make replacements and repairs to the approval of the Engineer and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Engineer to justify an extension in the contract time of completion.

END OF SECTION

SECTION 01700

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition.

C. Pre-installation meetings.

D. Cutting and patching.

E. Surveying for laying out the work.

F. Cleaning and protection.

G. Starting of systems and equipment.

H. Demonstration and instruction of Owner personnel.

I. Project Record Documents.

J. Closeout procedures, except payment procedures.

K. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 1 of these Specifications.

B. Other requirements for technical services are stated in other sections of these Specifications.

C. Section 01300 - Administrative Requirements

D. Section 01400 - Quality Requirements

E. Section 01560 - Temporary Erosion and Sedimentation Control

F. Section 01710 - Construction Waste Management and Disposal

G. Section 01780 - Closeout Submittals

H. Individual Product Specification Sections:
   1. Advance notification to other sections of openings required in work of those sections.
   2. Limitations on cutting structural members.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.

C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.
   6. Include in request:
      a. Identification of Project.
      b. Location and description of affected work.
      c. Necessity for cutting or alteration.
      d. Description of proposed work and products to be used.
      e. Alternatives to cutting and patching.
      f. Effect on work of Owner or separate Contractor.
      g. Written permission of affected separate Contractor.
      h. Date and time work will be executed.

D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

A. For survey work, employ a land surveyor registered in South Carolina and acceptable to Engineer. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in South Carolina.

C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in South Carolina.

1.06 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

E. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
   1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
   2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

G. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
   1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.

2. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.

H. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.07 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

D. Coordinate completion and clean-up of work of separate sections.

E. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Examine and verify specific conditions described in individual specification sections.

C. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

E. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Engineer four (4) days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two (2) days after meeting to participants, with two (2) copies to Engineer, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Engineer of any discrepancies discovered.

C. Control datum for survey is that indicated on Drawings.

D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

E. Promptly report to Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

G. Utilize recognized engineering survey practices.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

J. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

3.05 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

E. Prohibit traffic from landscaped areas.

F. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.07 PROJECT RECORD DOCUMENTS

A. Work includes:
   1. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Article 3.1 below.
   2. Upon completion of Work, deliver the recorded changes to the Engineer.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 1 of these specifications.
   2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these specifications.

C. Quality assurance:
   1. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Engineer.
   2. Accuracy of records shall be such that future search for items shown on the Project Record Documents may rely reasonably on the informationprovided under this Section of the Work.

D. Submittals:
   1. The Engineer's approval of the current status of Project Record Documents may be a prerequisite to the Engineer's approval of requests for progress payment and request for final payment under the Contract.
   2. Prior to submitting each request for progress payment, secure the Engineer's approval of the current status of the Project Record Documents.
   3. Prior to submitting request for final paayment, submit the final Project Record Documents to the Engineer and secure his approval.

E. Product handling:
   1. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer to the Engineer.
   2. In the event of loss of recorded data, use means necessary to again secure the data to the Engineer's approval.
      a. Such means shall include, if necessary in the opinion of the Engineer, removal and replacement of concealing materials.
      b. In such case, provide replacements to the standards originally required by the Contract Documents.

F. Maintenance of Job Set:
   1. Immediately upon receipt of the job set described in above paragraph titled "JOB SET DOCUMENTS", identify each of the Documents with the title, "RECORD DOCUMENTS-JOB SET".
   2. Preservation:
      a. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Engineer.
      b. Do not use the job set for any purpose except entry of new data and for review by the Engineer.
      c. Maintain the job set at the site of Work as that site is designated by the Engineer.
   3. Making entries on Job Set Drawings:
      a. Use erasable colored pencil, preferably red (not ink or indelible pencil) to delineate changes.
      b. Show by station number location of all fittings, manholes, valves, wye locations, etc.
      c. Reference all fittings and valves to two aboveground items reasonably safe from being relocated and indicate such referencs on the drawings.
      d. Show locationof electrical conduit, pull boxes, etc.

4. Submittal:
    a. Submit "marked-up" set of drawings to the Engineer.
        1) Make any necessary additions as required by the Engineer.

3.08 CLOSEOUT PROCEDURES

A. Work included shall be providing compliance with the requirements of the General Conditions of these Specifications for administrative procedures in closing out the project work.

B. Make submittals that are required by governing or other authorities.
    1. Provide copies to Engineer.
    2. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.
    3. When the Engineer finds the Contractor's work acceptable, the Contractor shall be given such notice and should proceed with closeout submittals.
    4. Closeout submittals shall contain at least the following:
        a. Project record documents.
        b. Warranties and bonds.
        c. Spare parts and manuals.
        d. Evidence of payment and release to liens per General Conditions.

C. Notify Engineer when work is considered ready for Substantial Completion.
    1. The Contractor shall notify the Engineer that, in his opinion, the project is substantially complete. A written statement listing items complete shall be submitted.
    2. Upon receipt of the Contractor's notice, the Engineer shall make an observation to determine if substantial completion is provided.
    3. If, in the Engineer's opinion, the project is not substantially complete, a written notice to the Contractor shall follow outlining reasons and deficiencies in work that comprised the Engineer's decision. The Engineer's decision shall be final.

D. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Engineer's review.

E. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.

F. Accompany Engineer & Owner on preliminary final observation.
    1. The Engineer will make a final observation for the Contractor after all items noted in the substantial completion observation have been corrected. The Contractor shall notify the Engineer in writing when a final observation is needed. Incomplete and/or defective work shall be given to the Contractor by written notice.

G. Complete items of work determined by Engineer's final inspection.

H. Reobservation:
    1. Re-observation required due to failure by the Contractor to make previously noted corrections will be performed by the Engineer.
    2. Cost for such observations will be due to and payable by the Contractor at a rate equal to charges to the Owner for similar work.
    3. Re-observations will continue until the work is acceptable to the Engineer.

I. Final Payment:
    1. Final payment to the Contractor will be made upon completion of the previous items and others required by these specifications. A final statement shall be forwarded to the Engineer. The statement shall address:
        a. Previous change orders.
        b. Unit prices.
        c. Deductions for uncorrected work.
        d. Deductions for liquidated damages.
        e. Deductions for re-testing work.

f. Deductions for reobservation.
g. Deductions for shop drawing review.
h. Adjusted contract sum.
i. Previous payments.
j. Amount due.

2. When required, the Engineer will prepare a contract change order for adjustments not previously made.

3.09 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01710

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.
   5. Incineration, either on- or off-site.

E. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01300 - Administrative Requirements

B. Section 01600 - Product Requirements

C. Section 01700 - Execution and Closeout Requirements

D. Section 02110 - Clearing and Grubbing

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

A. See Section 01600 - Product Requirements for substitution submission procedures.

B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01600:
   1. Relative amount of waste produced, compared to specified product.
   2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Price.
   3. Proposed disposal method for waste product.
   4. Markets for recycled waste product.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01300 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01600 for waste prevention requirements related to delivery, storage, and handling.

C. See Section 01700 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 01300 - Administrative Requirements

B. Section 01700 - Execution and Closeout Requirements

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Engineer with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two (2) copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one (1) copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one (1) copy of completed documents fifteen (15) days prior to final inspection. This copy will be reviewed and returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.
   4. Submit two (2) sets of revised final documents in final form within ten (10) days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten (10) days after acceptance.
   2. Make other submittals within ten (10) days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten (10) days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.04 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

F. Manual: Bind in commercial quality 8-1/2 by 11 inch three (3) D side ring binders with durable plastic covers.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

SECTION 02060

SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Soils investigation report:
   1. A Report of Geotechnical Exploration has been prepared for the project by S&ME, Inc., dated February 16, 2015 for Greenwood Convenience Center Upgrade and Expansion, Carnell Drive, Florence, South Carolina (S&ME, Inc. Project No. 1439-15-003).
      a. A Copy of the report is included immediately behind this specification section.

B. Use of data:
   1. These reports were obtained only for the Engineer's use in design and is not a part of the Contract Documents.
   2. The report is available for bidders' information, but is not a warranty of subsurface conditions.
   3. It is the responsibility of the Bidders to visit the site and acquaint themselves with the existing conditions.
   4. Prior to bidding, bidders may make their own Subsurface Investigations to satisfy themselves as to site and subsurface soil conditions, but these investigations must be performed under the time schedules and arrangements that have been approved in advance by the Engineer.

1.02 QUALITY ASSURANCE

A. The Owner will retain a soils engineer to observe the performance of work in connection with excavating, trenching, filling, backfilling and grading, and to perform compaction tests as required.

B. All work that is performed under this contract that does not meet technical or design requirements must be adjusted and no deviation from the Contract Documents can be made without specific and written approval from the Engineer.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

February 16, 2015

Alliance Consulting Engineers, Inc.
Post Office Box 8147
Columbia, South Carolina 29202

Attention: Mr. Tyler Gilstrap, E.I.T.
Engineering Associate

Reference: **Report of Limited Geotechnical Exploration**
Greenwood Convenience Center Upgrade & Expansion
Carnell Drive
Florence, South Carolina
S&ME, Inc. Project No. 1439-15-003

Dear Mr. Gilstrap:

S&ME, Inc. has completed a limited exploration of the near surface subgrade soils at the referenced project site. Our exploration was conducted in general accordance with our Proposal No. 14-1400908, dated December 4, 2014 as accepted by Alliance Consulting Engineers, Inc. by issuance of Task Order 15103-0021, dated January 19, 2015, which references our documents.

This report presents the findings of our exploration, along with our conclusions and recommendations for construction of the proposed pavements.

PROJECT INFORMATION

Project information was initially provided in email correspondence between Trapp Harris (S&ME) and Tyler Gilstrap (Alliance) on November 24, 2014. This email included four undated preliminary conceptual site layout option sketches prepared by Alliance. Additional information was provided by Mr. Gilstrap to Will Kannon (S&ME) during a telephone conversation on December 2, 2014. During this conversation, Mr. Gilstrap requested that S&ME provide a proposal for geotechnical exploration at the Greenwood Convenience Center. Additional project information was provided in an email from Mr. Jesse Mefford, E.I.T. (Alliance), which attached "Conceptual Site Layout (Option 4)", prepared by Alliance dated November 24, 2014.

The site is located on Carnell Drive, just west of the intersection with S.C. Highway 51 in Florence County, South Carolina. An existing Convenience Center facility of approximately 2 acres in size is located in the eastern portion of the site. The ground surface of the existing facility is covered with aggregate base. A raised platform with

associated retaining wall is located near the center of the existing facility. The expansion area is proposed to be an additional 2 acres in size and is adjacent to (west of) the existing facility. A site vicinity map is included in the appendix as Figure 1.

We understand that site improvements will consist of upgrades (in the form of new pavements) to the existing facility, and a new expansion. New site pavements will consist of a mixture of flexible (asphaltic) pavements and rigid (Portland cement concrete) pavements. Based on our review of the provided conceptual layout plan, dumpster pads will likely consist of Portland Cement Concrete (PCC) pavements and drive areas will be predominantly asphaltic pavements. We understand that no new above-grade structures are proposed for the site at his time.

Traffic frequency and loading data was not available prior to our preparing this report; however based on our past experience, we anticipate that daily traffic for the facility may consist of 300 automobiles/light trucks two-way trips per day and up to 5 dumpster trash trucks (each weighing about 65,000 pounds) two-way trips per day, five days per week, 52 weeks per year, for 20 years. These assumptions were used in our pavement thickness calculations in the absence of any traffic loading information from the client. If the actual traffic varies from these assumptions, we should be contacted to revise our pavement section thickness recommendations based upon the actual traffic loads. It was beyond the scope of our exploration to perform a traffic study.

EXPLORATION PROCEDURES

Representatives of S&ME visited the site on January 27 and 28, 2015 to observe and test the soil in the proposed pavement areas within the proposed development.

Field Exploration Procedures

State law requires that we notify the Palmetto Utility Protection Service (PUPS) before we drill or excavate at any site. PUPS is operated by the major water, sewer, electrical, telephone, CATV, and natural gas suppliers of South Carolina. PUPS forwarded our location request to the participating utilities. Location crews then marked buried lines within 72 hours. We checked proposed sampling points for conflicts with marked utilities or man-made structures during the site walkover.

The field work for this project included the layout of nine (9) test locations (HA-1 through HA-9) with hand auger borings and conventional dynamic cone penetrometer (DCP) testing performed in all borings and Kessler (Dual-Mass) DCP testing performed in the upper 18 inches of borings HA-6 through HA-9. Test locations were selected by S&ME personnel, and the approximate test locations are indicated on the Test Location Sketch as Figure 2, attached to this report.

At test locations HA-1 through HA-5 (performed within the proposed expansion area), borings were advanced using hand operated augers to penetrate to the boring termination depths of 4 to 5 feet. Boring HA-3 was terminated at a depth of about 4 feet because groundwater suction did not allow further advancement of the bore hole. Conventional DCP testing was performed at regular depth intervals of approximately 1 foot each within

the hand auger borings in general accordance with ASTM STP 399 procedures to help us estimate the relative density and consistency of the subgrade soils. These bore holes were left open for a period of about 24 hours to observe water levels. After water level measurements were completed, the bore holes were backfilled with soil cuttings to the ground surface.

At test locations HA-6 through HA-9 (performed within the existing facility), we performed in-place Kessler (Dual-Mass) DCP tests on the existing surface base course and underlying soils to a depth of about 18 inches. The Kessler (or dual-mass) DCP consists of a steel extension shaft assembly with a 60 degree hardened steel cone tip attached to one end. The tip is driven into the subgrade by dropping an 8 kilogram (17.6 pounds) dual mass hammer 575 millimeters (1.9 feet). The depth of penetration is measured at selected hammer drop intervals and recorded values are converted to California Bearing Ratio (CBR) values through correlations developed by the U.S. Army Corps of Engineers, in general accordance with ASTM D 6951 procedures. Conventional DCP testing was then performed within each test location, beginning at a depth of about 2 feet below the ground surface and extending to a depth of about 5 feet below the surface.

Water levels were measured at the time of completion of each boring; however, these bore holes were not left open for later water level observations due to safety concerns because they are in high foot-traffic areas. After water levels were measured, the holes were backfilled with soil cuttings to the ground surface.

Small grab samples of subsurface soil materials were collected from representative subsurface strata within the borings. Some of the soil cuttings within the upper 2 feet of the borings were also collected to form two composite bulk samples. Soils recovered from borings HA-1 through HA-5 formed composite sample “Bulk 2”, and soils recovered from borings HA-6 through HA-9 formed composite sample “Bulk 1”. Within the borings, our engineer observed and documented the subgrade soil types observed and subsurface water levels, where encountered.

A summary of the exploration procedures is included in the appendix, along with the Kessler DCP Test Results and Hand Auger Boring Logs, which present more detailed information regarding the subsurface conditions encountered at individual test locations.

Laboratory Testing

After the recovered soil samples were brought to our laboratory, a geotechnical professional examined and/or tested each sample to estimate its distribution of grain sizes, plasticity, organic content, moisture condition, color, presence of lenses and seams, and apparent geologic origin in general accordance with ASTM D 2488, *“Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)”*. The resulting classifications are presented on the boring logs included in the appendix. Similar soils were grouped into representative strata on the logs.

We performed the following quantitative ASTM-standardized laboratory tests on the composite bulk samples and small grab samples to help classify the soil and formulate

our conclusions and recommendations. The laboratory tests performed included the following:

- Four samples tested in general accordance with ASTM D 2216, "*Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass"*, to measure the in situ moisture content of the soil.
- Four samples tested in general accordance with ASTM D 4318, *"Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils"*, to measure the plastic behavior of the soil.
- Four samples tested in general accordance with ASTM D 1140, "*Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75-µm) Sieve"*, to measure the percent clay and silt fraction.
- One sample tested in general accordance with ASTM D 422, *"Standard Test Method for Particle Size Analysis of Soils*," without the hydrometer portion, to measure the distribution of particle sizes greater than 75 micrometers.
- One sample tested in general accordance with ASTM D 1557, *"Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 lbf/ft3)"*, to measure the moisture-density relationship of the soil.
- One specimen from the selected bulk sample recompacted and tested in general accordance with ASTM D 1883, *"Standard Test Method for CBR (California Bearing Ratio) of Laboratory-Compacted Soils"*, to evaluate soil support characteristics for pavements.

The laboratory test results are attached in the appendix. The procedures for the above listed tests are also attached to this report in the appendix.

SURFACE CONDITIONS

Proposed Expansion Area

The ground surface within the proposed expansion area was bare earth. We understand that this area was heavily wooded and has been recently cleared. Fill soils up to 2 feet in thickness have been placed within this area. We have not been provided with documentation of density testing for these recently placed fill soils. During our exploration, the ground surface was very wet and was observed to exhibit some instability (pumping) under foot traffic. Several areas of ponded water were observed at the ground surface in this area during our exploration. No existing structures were located within this portion of the site at the time of our exploration.

Existing Facility

The ground surface for the existing facility was covered with graded aggregate base course (GABC) materials. A raised earth platform area is located near the central portion of the existing facility and a small structure is located within this raised area. The ground surface within the areas explored was stable underfoot and we did not observe any ponded water within the areas covered with aggregate base. A few areas near the

northwestern corner of the existing facility were bare earth and were observed to hold some ponded water and were rutted possibly from dumpster truck traffic.

SUBSURFACE CONDITIONS

The generalized subsurface conditions encountered within the borings performed in the explored areas are described below. For more detailed descriptions and stratifications at a test location, the respective test logs should be reviewed in the appendix.

Graded Aggregate Base Course Materials

Graded aggregate base course (GABC) was encountered at the ground surface in the borings performed within the existing facility (HA-6 through HA-9) and ranged in thickness from 7 ¼ to 11 inches in thickness.

Kessler DCP tests conducted on the GABC materials yielded CBR values ranging from 95 to 100 percent. These results indicate that the in-place GABC would provide good support for the proposed overlying pavement section.

Undocumented Fill Soils

At the ground surface in borings HA-1 through HA-5 and beneath the aggregate base course in borings HA-6, HA-8, and HA-9, undocumented fill soils consisting primarily of silty sands (USCS Classification "SM") and clayey sands (SC) were encountered to depths ranging from about 1 to 3 ½ feet below the ground surface. These soils were moist to wet and were generally reddish brown to yellowish brown in color.

DCP penetration resistances in these sandy soils ranged from 6 to 12 blows per increment (bpi), with an average penetration resistance of 8 bpi, indicating a generally loose relative density, with some medium dense layers.

Kessler DCP tests conducted on the fill soils within the existing facility yielded CBR values ranging from 14 percent to 49 percent and averaging about 26 percent overall. These results indicate that the in-place fill soils should provide relatively good subgrade support for the proposed overlying pavement section.

Two bulk samples were collected from soils in this fill stratum. Sample "Bulk 2" was collected in the expansion area at boring locations HA-1 through HA-5, between depths of about 0 to 2 feet, within a zone of recently placed fill. Soil type was determined to be silty sand (SM) with a fines content of 17.8 percent passing the No. 200 sieve. Atterberg limits testing indicated non-plastic behavior for the material passing the No. 40 sieve. The fill soil had a natural moisture content of 15.8 percent, indicating that these soils are about 6.1 percent above the optimum moisture content for compaction. Sample "Bulk 2" was subjected to further testing including moisture density relationship (Proctor) and California Bearing Ratio (CBR). The modified Proctor maximum dry density was 125.3 lbs. per cubic foot (pcf) at an optimum moisture content of 9.7 percent. The CBR of this sample was 32.5 percent, at penetration of 0.1 inches when the sample was re-compacted to approximately 95 percent of the modified Proctor maximum dry density. CBR values within this range indicate generally good soil support conditions for pavements, when

this soil is properly compacted at the optimum moisture content. Our observations in the field indicate that this soil may not have been properly compacted at the time of our exploration, and should be further tested for density (percent compaction) and observed for stability prior to construction of any graded aggregate base courses or pavements.

Sample "Bulk 1" was collected at boring locations HA-6 through HA-9, between depths of about 1 to 2 feet. This sample was composed by blending several strata, combining fill with the underlying topsoil and upper Coastal Plain soils. Soil type was determined to be silty-clayey sand (SC-SM) with a fines content of 30.5 percent passing the No. 200 sieve. Atterberg limits testing measured a liquid limit of 20 percent, a plastic limit of 16 percent and a plasticity index of 4 percent, indicating low plasticity behavior. The soil had a natural moisture content of 12.2 percent.

Topsoil

Underlying the fill in borings HA-2, HA-3, HA-4, HA-7, HA-8, and HA-9, a layer of topsoil ranging in thickness from about 4 to 11 inches was encountered to depths ranging from about 1½ to 2½ feet. This layer was composed primarily of silty sand (SM) and contained some organics in the form of roots and some decaying organic matter. Coloration was black, dark gray, and grayish brown and these soils were generally wet.

DCP penetration resistances in these soils ranged from 4 to 8 blows per increment (bpi), with an average penetration resistance of 6 bpi, indicating a generally loose relative density, with some very loose layers.

Kessler DCP tests conducted on the these soils encountered within the upper 18 inches in the existing facility (borings HA-7 and HA-9) yielded CBR values ranging from 4 percent to 13 percent and averaging about 9 percent overall. These results indicate that these in-place soils provide poor to fair support for the overlying materials.

Coastal Plain Sediments

Beneath the fill soils in hand auger borings HA-1, HA-5, and HA-6 and beneath the topsoil in borings HA-2, HA-3, HA-4, HA-7, HA-8, and HA-9, Coastal Plain sediments generally consisting of clayey sands (SC) and sandy lean clays (CL) were encountered to the boring termination depth of 5 feet at each test location.

Clayey sands (SC) were predominately observed in most of the borings to depths of about 3½ to 4½ feet, after which soils generally were observed to consist of sandy lean clays (CL). These soils were generally moist to wet, and were gray and orange in color.

DCP penetration resistances in the clayey sand soils ranged from 2 to 9 bpi, with an average penetration resistance of 5 bpi, indicating a generally loose relative density with some very loose layers. DCP penetration resistances in the sandy lean clay soils ranged from 4 to 12 bpi, with an average penetration resistance of 7 bpi, indicating a generally firm consistency with some soft to stiff consistency soils.

Where measured, soils within this stratum exhibited natural moisture contents ranging from 20.4 to 21.4 percent, silt and clay fines contents ranging from 45.8 to 48.0 percent, and Atterberg limits testing of the minus #40 sieve materials measured liquid limits ranging from 30 to 36 percent, plastic limits ranging from 14 to 18 percent, and plasticity indices ranging from 16 to 18 percent, indicating low to medium plasticity behavior.

Laboratory Test Results

We performed laboratory testing on selected grab and bulk samples to confirm the field soil classifications and assess the engineering properties of the subsurface soils. The laboratory soil index test results are presented in the appendix and are summarized in the following tables.

Table 1 – Summary of Laboratory Soil Index Testing Results

Boring/ Sample No.	Sample Depth (Feet)	Natural Moisture Content (%)	Fines Content (%)	Atterberg Limits			USCS Classification
				LL	PL	PI	
BULK 1	1' – 2'	12.2	30.5	20	16	4	SC-SM
BULK 2	0 – 2'	15.8	17.8	---	NP*	---	SM
HA-2	2' – 3'	20.4	45.8	30	14	16	SC
HA-7	2' – 3'	21.4	48.0	36	18	18	SC

*NP = Non-plastic

Table 2 – Summary of Moisture-Density and CBR Test Results

Boring/Sample No.	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR at 0.1 in. Penetration – 95% Compaction (%)
HA-1 to 5 / BULK 2	125.3	9.7	32.5

Subsurface Water

At the time of our exploration, subsurface water was encountered at depths ranging from 2 ½ to 4 ½ feet in the borings. After a period of about 24 hours, water levels within borings HA-1 through HA-5 ranged from 1½ to 2½ feet below the ground surface. 24-hour water levels were not measured within the borings performed within the existing facility (HA-6 through HA-9), because the bore holes were backfilled after drilling due to safety concerns. The boreholes were backfilled with soil cuttings after water measurements were completed. Water levels may fluctuate seasonally at the site, being influenced by rainfall variation and other factors.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations included in this section are based on the project information outlined previously and the data obtained during our exploration. If conditions are encountered during construction that differ from those encountered at our test locations, then S&ME, Inc. should be retained to review the following recommendations based upon the new information and make any necessary changes.

Based on our exploration results and past experience with similar projects, our recommendations generally relate to subgrade preparation to improve available soil support, and construction of new pavement sections comprised of hot mix asphaltic concrete or Portland cement concrete, with graded aggregate base course (GABC) atop properly prepared subgrade soils.

Subgrade Preparation Recommendations

Based on the findings of our exploration, we offer the following recommendations regarding stabilization of the subgrade soil conditions within the expansion areas of the site and densification of the existing GABC within the existing facility area of the site.

An S&ME engineer or his designated representative should be requested to be present during proofrolling of the existing site and for repair operations of the expansion site area to observe field conditions and provide further recommendations for stabilization based on observed conditions. The recommended methods, extent and depth of repairs will depend to some extent upon the conditions encountered at the time of construction.

Expansion Area

Site preparation for the expansion areas should include establishment of drainage and densification and stabilization of the undocumented fill soils. The following section details our recommendations for this area of the site.

1. Prior to grading, the expansion area of the site should be crowned and ditched to promote positive drainage away from the working surface. To facilitate drainage, we recommend that a perimeter ditch be excavated around the expansion area with gravity drainage leading off-site. This ditch should be excavated to a depth as to maintain water levels below a minimal depth of 2 feet below the working subgrade surface. This will help reduce the potential for moisture damage to the subgrade during earthwork operations and should help with stabilization of the subgrade.

2. After drainage is established, the surface should be moisture conditioned until the soil moisture content is at or slightly below optimum to a depth of at least 12 inches, and thoroughly densified at the surface with a heavy, smooth-drum vibratory roller under the observation of the Geotechnical Engineer (S&ME, Inc.) or his representative.

3. Field density (“compaction”) tests should be performed after surface densification is performed on the subgrade to measure that the compaction levels recommended in this report are achieved (at least 95 percent of the modified Proctor maximum dry density). Areas not meeting the compaction requirements should be reworked and

retested until the proper degree of compaction is achieved, unless otherwise advised by the Geotechnical Engineer.

4. Because of the thickness and generally loose, unstable condition of the undocumented fill within the future expansion area, we also recommend that density testing be performed beginning at a depth of about 1 foot below the fill surface, to check the compaction of the lower half of the fill at least once per 5,000 square feet of area. If these tests do not indicate that the recommended compaction levels have been achieved within the lower half of the fill, then it is recommended that the contractor temporarily remove the upper foot of fill soils, which may be temporarily stockpiled around the perimeter of the site (or offsite), and then densify the cut surface until satisfactory density is achieved throughout the bottom portion of the fill embankment as determined by additional density testing. Because of the shallow groundwater condition encountered at this site, it will likely be necessary to operate the roller in "static" mode to prevent water from coming up into the fill soils unless the site has been aggressively drained before this work is performed.

   After satisfactory density has been achieved on the lower half of the fill, the removed stockpiled fill soils may be replaced, compacted to the recommended levels, and tested for compaction.

5. Following densification of the surface and/or remediation of the underlying fill soils, the densified soil surface should be proofrolled under the observation of the Geotechnical Engineer by having the contractor make repeated overlapping passes with a fully-loaded tandem-axle dump truck or similarly high ground pressure equipment prior to the import and placement of any "new" fill. The proofrolling should be conducted only during dry weather to avoid deteriorating the surface. Areas of rutting or pumping soils indicated by the proofroll may require selective undercutting or further stabilization prior to fill placement or pavement section construction, as determined by the Geotechnical Engineer. Borings HA-2, HA-3, and HA-4 each encountered a layer of organic silty sand topsoil beneath the fill layer. This soil is unlikely to pass a satisfactory proofroll, and will therefore likely need to be removed (undercut) and replaced with fill soil in order to achieve a stable subgrade.

6. Backfilling should be performed in accordance with the "Fill Placement and Compaction Requirements" section of this report.

7. If the schedule constraints are restrictive, if prevailing weather conditions are unfavorable, and/or if extreme difficulty is encountered in stabilizing the cut soil surface using traditional methods, then further stabilization using mechanical or chemical stabilization techniques may be required. This should be addressed on a case-by-case basis during construction by the Geotechnical Engineer.

8. Once final soil subgrade elevations are achieved and the subgrade is properly prepared, the exposed soils should be proofrolled under the observation of the

Geotechnical Engineer (S&ME) at final soil subgrade elevation prior to base course installation. If any areas of instability are observed during the proofroll, further stabilization may need to be performed, as determined by the Geotechnical Engineer. After a successful proofroll, construction of the new graded aggregate base course may begin.

Existing Facility

Surface preparation for the existing facility should include grading and densification of the existing GABC surface. We recommend that thickness checks and in-place density testing be performed to measure the thickness and density of the GABC at least once per 5,000 square feet of area. We recommend that, after grading, at least 7 inches of GABC be present at each test location, and that compaction of at least 100 percent of the modified Proctor maximum dry density be achieved. If any areas are found to be of deficient thickness, and the grade elevation design does not allow additional GABC to be added, then it will be necessary to remove the GABC, lower the soil subgrade elevation, and then replace the GABC in order to obtain the proper minimum thickness.

Based upon our borings, each of the test locations we explored exhibited a GABC thickness of at least 7 inches; however, there may be some unexplored locations where the GABC layer is too thin and needs to be thickened. The need to remove GABC and lower the subgrade could potentially be avoided if future grade designs allow for the placement of new GABC above existing grade elevations.

If or where the GABC is removed to lower the subgrade, the exposed subgrade after GABC removal should be proofrolled to observe for stability similar to the methods described in the previous section of this report; where subgrades are found to be unstable, removal and replacement of the subgrade soils should be performed. At test HA-7, for example, the subgrade soil beneath the GABC layer was observed to be an organic silty sand topsoil material. This soil is unlikely to pass a satisfactory proofroll, and where encountered would likely need to be removed (undercut) and replaced with fill soil in order to achieve a stable subgrade.

Following achievement of satisfactory results of the thickness and density testing, the GABC surface should be proofrolled under the observation of the Geotechnical Engineer prior to placement of pavements. If any areas of instability are observed during the proofroll, further stabilization may need to be performed, as determined by the Geotechnical Engineer. After a successful proofroll, construction of the pavement may begin.

Fill Placement and Compaction Requirements

Where fill soils are to be placed on this project site, the following recommendations apply:

1. We do not recommend the use of native on-site soils to build up the site; therefore we recommend that all new fill consist of imported select fill. Imported fill soils that are used to build up the ground for pavements should meet the following minimum requirements: plasticity index of 10 percent or less; clay/silt fines content of not greater than 20 percent; natural moisture content within plus or minus 2 percent of the optimum moisture content at the time of delivery. Imported fills outside of this moisture range may need to be moisture-conditioned prior to compaction. Acceptable fill materials may include soils from the following ASTM soil classifications: SW, SP, SW-SM, SP-SM, SW-SC, SP-SC, SM, and/or SC. However, not all soils in these categories will comply with the plasticity and fines content requirements; therefore, the contractor should sample each fill material that they propose to use and submit it to the Geotechnical Engineer for determination of its suitability, and measurement of the maximum dry density, optimum moisture content, and natural moisture content. The previously imported fill materials observed on the future expansion site appear to be of suitable soil type meeting these criteria, but also appear to be wet and needing moisture-conditioning prior to further compaction.

2. Structural fill under pavements should be compacted to at least **95 percent** of the maximum dry density as defined by ASTM D1557-09 *"Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))"* (ASTM D 1557).

   a) Compacted soils must not exhibit pumping or rutting under equipment traffic.

   b) Loose lifts of fill should be no more than 8 inches in thickness prior to compaction (limited to 4 inches if using small, hand-operated equipment such as a walk-behind vibrating plate tamp or pneumatic "jumping jack" tamp).

   c) Structural fill should extend at least 5 feet laterally beyond the edge of pavements before being allowed to exhibit a lesser degree of compaction.

   d) In non-structural fill areas only, such as in landscaped areas that are located at least 5 feet outside the footprint of pavements, fill should be compacted to at least 90 percent of the maximum dry density by the Modified Proctor criterion (ASTM D 1557).

3. Fill placement should be observed by an S&ME soils testing technician working under the guidance of the geotechnical engineer.

   a) At least one field density test should be performed per each 5,000 square feet for each lift of soil in large area fills, with a minimum of 2 tests per lift.

   b) At least one field density test should be conducted per each 150 cubic feet of fill placed in confined areas such as isolated undercuts and in trenches, with a minimum of 1 test per lift.

   c) At least one field density test should be conducted for each 250 linear feet of road alignment backfill, with a minimum of 1 test per lift per section.

Pavement Recommendations

Site pavements will consist of a mixture of flexible pavement using Hot-Mixed Asphalt (HMA) and rigid pavements consisting of Portland cement concrete (PCC). A GABC layer thickness of 7 inches was assumed for design, because that was the smallest layer thickness observed in borings HA-6 through HA-9 within the existing GABC area.

Based upon the requirement that the in-situ materials will be densified as described in the "Fill Placement and Compaction" section of this report, and assuming that the pavement support soils consist of sandy soils meeting the material requirements of the aforementioned section, we estimate that a California Bearing Ratio (CBR) value of at least 15 percent will be available for pavement support. This results in a resilient modulus of at least 14,450 psi available for flexible pavement design, and a modulus of subgrade reaction (k) value of about 225 psi/inch available for rigid PCC pavement design. If materials having lesser subgrade support values are to be considered for use, the pavement design should be reevaluated and required pavement thicknesses may need to be increased as a result.

Flexible pavement design assumes an initial serviceability of 4.2 and a terminal serviceability index of 2.0, and a reliability factor of 95 percent. ESALs per axle were estimated using data provided in AASHTO literature. Assuming that only SCDOT approved source materials will be used in flexible pavement section construction, we used a structural layer coefficient of 0.44 for the HMA layers and a coefficient of 0.18 for the graded aggregate base course (GABC). A sub-base drainage factor of 0.85 was assigned, based upon the assumption that the sub-base soils will consist of native soils.

Rigid pavement design assumes an initial serviceability of 4.5 and a terminal serviceability index of 2.5, and a reliability factor of 85 percent. **Assuming that appropriately designed load transfer devices (dowels) will be used at all of the joints in the rigid pavement**, we used an average load transfer coefficient of 3.2. Unreinforced concrete pavements would need to be up to 2 inches thicker to accommodate the same traffic loading. We also assumed a minimum 28-day design compressive strength of at least 4,000 psi for the PCC. A sub-base drainage factor of 0.85 was assigned, based upon the assumption that the sub-base soils will consist of native soils.

Based on the provided information and our experience with similar projects, we estimate that site pavements may experience up to 530,000 ESALs consisting of the following vehicles, loading, and frequencies:

- Automobiles and light trucks – 300 two-way trips per day, 260 days per year, for 20 years – average vehicle factor of 0.001, 18-kip Equivalent Single Axle Load (ESAL) per pass.
- Dumpster (Roll-back) Trucks - 5 two-way trips per day, 260 days per year, 52 weeks per year, for 20 years – average vehicle factor of 5.0, 18-kip ESALs per pass.

Based on this ESAL demand, we have estimated that the minimum pavement section thicknesses for both asphaltic (flexible) and PCC (rigid) pavements shown in Table 3

below should be sufficient to carry the anticipated traffic loading with reasonable factors of safety.

Table 3: Recommended Minimum Pavement Sections[(a)]

(a)Single-stage construction and soil compaction as recommended is assumed; S&ME, Inc. must observe pavement subgrade preparations and pavement installation operations.

Pavement Type	Theoretical Available Traffic Capacity (ESALs)	HMA Surface Course Type B (inches)	HMA Intermediate Course Type B (inches)	4,000 psi PCC Pavement Section (inches)	Compacted SCDOT Graded Aggregate Base Course [GABC] (inches)
Heavy-Duty HMA Flexible	550,000	1.5	2	---	7.0
Heavy-Duty PCC Rigid	530,000[1]	---	---	6.0	6.0

1. Denotes a Reliability level of 85%. If a reliability level of 95% is desired, then PCC thickness should be increased by 1 inch to obtain a similar traffic capacity.

Permanent Drainage Systems

1. Because of the potential for shallow perched water conditions to develop at this site during wet times of the year, permanent underdrains should be considered for installation in pavement area subgrades to provide permanent drainage protection for the pavements. The site civil engineer should be consulted regarding the appropriate extent and locations of underdrains. We are able to provide you with a typical detail for gravel-filled, fabric-wrapped underdrains, if requested.

2. The underdrains (also sometimes known as "French" drains) should be constructed using SCDOT No. 57 or No. 67 stone and a 4-inch or 6-inch diameter HDPE perforated plastic pipe, with the gravel-filled trench being wrapped in a non-woven geotextile, such as Mirafi's N-Series fabrics. French drains are typically designed to tie into the nearest storm sewer catch basin, or other discharge points as selected by your site civil engineer.

Base Course and Pavement Section Construction

The following recommendations are provided for base course and pavement section construction:

1. Prior to placement of base course stone, all exposed pavement subgrades should be methodically proofrolled under the observation of the geotechnical engineer (S&ME), and any identified unstable areas should be repaired. Pavement subgrades should not exhibit rutting or pumping under the proofroll load. Rutting or pumping areas shall be undercut and replaced and/or stabilized as directed by the engineer.

2. Crushed stone aggregate base material used in pavement section construction should consist of graded aggregate base course (GABC) as defined by Section 305 of the South Carolina Department of Transportation Standard Specifications for Highway

Construction (2007). The base course should be compacted to at least 100 percent of the modified Proctor maximum dry density (SC-T-140). The base course material should not exhibit pumping or rutting under equipment traffic.

3. Heavy compaction equipment is likely to be required in order to achieve the required base course compaction, and the moisture content of the material will likely need to be maintained near optimum moisture content in order to facilitate proper compaction.

4. Construct the surface course HMA in accordance with the specifications of Sections 401 through 403 of the South Carolina Department of Transportation Standard Specifications for Highway Construction (2007 edition).

5. Sufficient testing should be performed during flexible pavement installation to confirm that the required thickness, density, and quality requirements of the pavement specifications are followed.

6. Experience indicates that a thin surface overlay of asphalt pavement may be required in about 7 to 10 years due to normal wear and weathering of the surface. Such wear is typically visible in several forms of pavement distress, such as aggregate exposure and polishing, aggregate stripping, asphalt bleeding, and various types of cracking. There are means to methodically estimate the remaining pavement life based on a systematic statistical evaluation of pavement distress density and mode of failure. We recommend the pavement be evaluated in about 7 years to assess the pavement condition and remaining life.

LIMITATIONS OF THIS REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations in this report are based on the applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

The analyses and recommendations submitted herein are based, in part, upon the data obtained from the borings. The nature and extent of variations across the site may not become evident until construction. If variations appear evident, then we should be provided an opportunity to re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the improvements are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions modified or verified in writing by the submitting engineers.

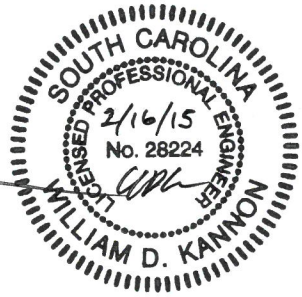
Assessment of site environmental conditions; sampling of soils, ground water or other materials for environmental contaminants; identification of jurisdictional wetlands, rare or endangered species, geological hazards or potential air quality and noise impacts were beyond the scope of this geotechnical exploration. Information regarding other

construction items including but not limited to buildings, curbing, street lights, signage, utilities, flagpoles, etc. was not provided by the client and therefore has not been addressed as part of the scope of this report. If additional design or construction recommendations are needed with regard to any such items, please contact us.

CLOSURE

S&ME, Inc. appreciates the opportunity to have provided our services on this project. If you have any questions concerning this report, please do not hesitate to contact us.

Very truly yours,
S&ME, Inc.



William D. Kannon, P.E.
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Ronald P. Forest, Jr., P.E.
Senior Engineer
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Attachments: Appendix

APPENDIX

SITE VICINITY MAP

TEST LOCATION SKETCH

SUMMARY OF EXPLORATION PROCEDURES

SOIL CLASSIFICATION CHART

HAND AUGER BORING LOGS

KESSLER DCP TEST RESULTS

SUMMARY OF LABORATORY PROCEDURES

LABORATORY TEST RESULTS



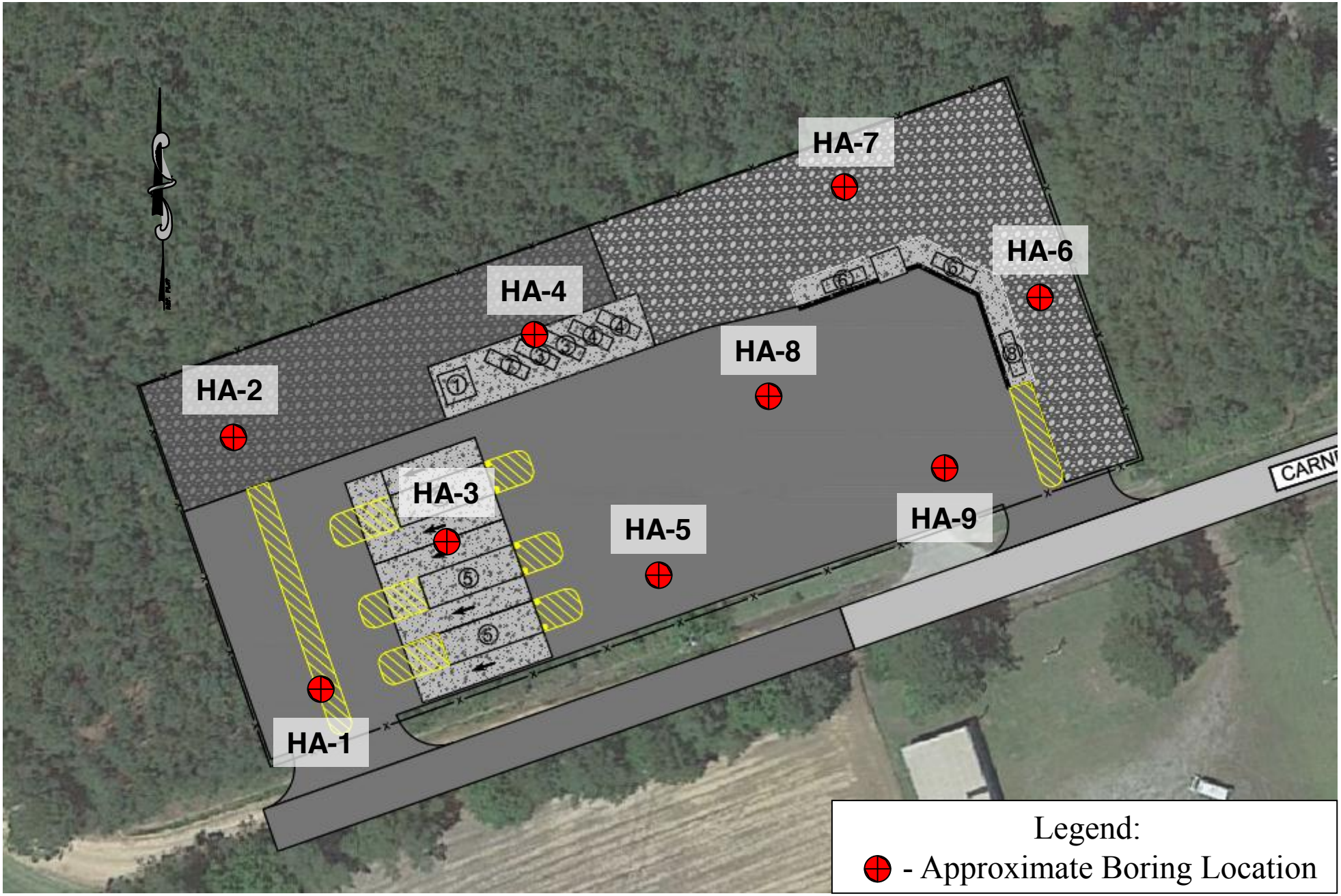
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DRAWN BY:	WDK
CHECKED BY:	RPF
DATE:	Feb. 2015

S&ME
ENGINEERING • TESTING
ENVIRONMENTAL SERVICES

SITE VICINITY MAP
Greenwood Convenience Center
Florence, South Carolina

PROJECT NO.: 1439-15-006

FIGURE NO.
1



SCALE:	NTS
CHECKED BY:	RPF
DRAWN BY:	WDK
DATE:	Feb. 2015

S&ME

TEST LOCATION SKETCH
Greenwood Convenience Center
Florence, South Carolina

JOB NO. 1439-15-003

FIGURE NO
2

SUMMARY OF EXPLORATION PROCEDURES

The American Society for Testing and Materials (ASTM) publishes standard methods to explore soil, rock and ground water conditions in Practice D-420-98, "*Standard Guide to Site Characterization for Engineering Design and Construction Purposes*." The boring and sampling plan must consider the geologic or topographic setting. It must consider the proposed construction. It must also allow for the background, training, and experience of the geotechnical engineer. While the scope and extent of the exploration may vary with the objectives of the client, each exploration includes the following key tasks:

- Reconnaissance of the Project Area
- Preparation of Exploration Plan
- Layout and Access to Field Sampling Locations
- Field Sampling and Testing of Earth Materials
- Laboratory Evaluation of Recovered Field Samples
- Evaluation of Subsurface Conditions

The standard methods do not apply to all conditions or to every site. Nor do they replace education and experience, which together make up engineering judgment. Finally, ASTM D 420 does not apply to environmental investigations.

RECONNAISSANCE OF THE PROJECT AREA

We walked over the site to note land use, topography, ground cover, and surface drainage. We observed general access to proposed sampling points and noted any existing structures.

BORING AND SAMPLING

Hand Auger Borings

Auger borings were advanced using hand-operated augers. The soils encountered were identified in the field by cuttings brought to the surface. Representative samples of the cuttings were placed in plastic bags and transported to the laboratory. Soil consistency was qualitatively estimated by the relative difficulty of advancing the augers.

At selected intervals, the augers were withdrawn and soil consistency measured with a dynamic cone penetrometer. The conical point of the penetrometer was first seated 1-3/4 inches to penetrate any loose cuttings in the boring, then driven two additional 1-3/4 inch increments by a 15 pound hammer falling 20 inches. The number of hammer blows required to achieve this penetration was recorded. When properly evaluated by qualified professional staff, the blow count is an index to the soil strength and ability to support foundations.

Kessler Dynamic Cone Penetrometer (DCP)

Kessler DCP tests were performed on the existing surface base course and underlying soils to a depth of about 18 inches. The Kessler (or dual-mass) DCP consists of a steel

extension shaft assembly with a 60 degree hardened steel cone tip attached to one end. The tip is driven into the subgrade by dropping an 8 kilogram (17.6 pounds) dual mass hammer 575 millimeters (1.9 feet). The depth of penetration is measured at selected hammer drop intervals and recorded values are converted to California Bearing Ratio (CBR) values through correlations developed by the U.S. Army Corps of Engineers, in general accordance with ASTM D6951.

Ground Water Level Determination

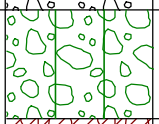
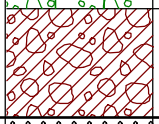
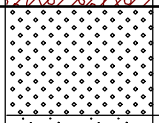
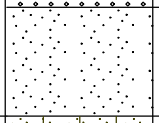
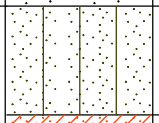
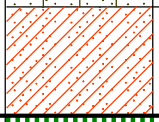
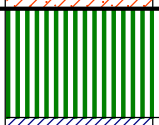
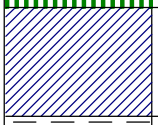
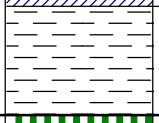
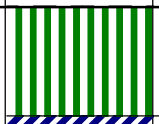
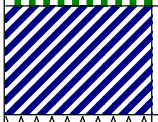
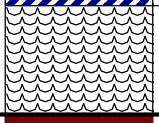
Subsurface water levels in the boreholes were measured during the onsite exploration by measuring depths from the existing grade to the current water level using a tape.

Backfilling

After the groundwater measurements, the boreholes were backfilled with soil cuttings to the ground surface.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

S&ME

HAND AUGER LOG NO. HA-1

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

WATER LEVEL: **TOB = 4.5', 24 hrs = 2.5'**

DATE DRILLED: **1/27/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0				
							Fill - SILTY SAND (SM) - Reddish brown, mostly fine to medium sand, some low plasticity fines, wet, loose.	5-6-8
				1				8-8-7
							CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet to moist, very loose.	
				2				4-4-4 ▼
				3				4-3-4
							CLAYEY SAND (SC) - Gray and orange (mottled), mostly fine to medium sand, some low to medium plasticity fines, moist, loose.	
				4				7-9-10 ▽
							SANDY LEAN CLAY (CL) - Gray, mostly low to medium plasticity fines, some fine sand, moist, stiff.	
				5			Boring terminated at 5 feet	11-10-13

This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

NOTES:

LOG OF HAND AUGER HA-1

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

HAND AUGER LOG NO. HA-2

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

WATER LEVEL: **TOB = 3', 24 hrs = 2'**

DATE DRILLED: **1/27/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0			**Fill** - SILTY SAND (SM) - Reddish brown, mostly fine to medium sand, some low plasticity fines, wet, loose.	5-5-6
				1			**Topsoil** sampled as SILTY SAND (SM) - Grayish brown and black, mostly fine to medium sand, some low to medium plasticity fines, some roots and decaying organic matter, wet, loose.	6-7-8
				2			CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet, loose to very loose.	5-4-5 ▼
				3				3-3-4 ▽
				4			SANDY LEAN CLAY (CL) - Gray, mostly low to medium plasticity fines, some fine sand, wet to moist, firm to stiff.	7-8-8
				5			Boring terminated at 5 feet	11-10-10

This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

NOTES:

LOG OF HAND AUGER HA-2

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

HAND AUGER LOG NO. HA-3

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

WATER LEVEL: **TOB = 2.5', 24 hrs = 1.5'**

DATE DRILLED: **1/27/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0			This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0			**Fill** - SILTY SAND (SM) - Reddish brown, mostly fine to medium sand, some low plasticity fines, wet, loose to medium dense.	7-9-8
				1				10-11-13
				2			**Topsoil** sampled as SILTY SAND (SM) - Grayish brown and black, mostly fine to medium sand, some low to medium plasticity fines, some roots and decaying organic matter, wet, loose.	8-7-7
				2			CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet to saturated, very loose.	
				3				4-3-3
				4			Boring terminated at 4 feet due to groundwater suction	3-2-2

NOTES:

LOG OF HAND AUGER HA-3

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

HAND AUGER LOG NO. HA-4

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

WATER LEVEL: **TOB = 2.5', 24 hrs = 1.5'**

DATE DRILLED: **1/27/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0			This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
				0			**Fill** - SILTY SAND (SM) - Reddish brown, mostly fine to medium sand, some low plasticity fines, wet, loose.	9-9-8
				1				7-7-8 ▼
				1			**Topsoil** sampled as SILTY SAND (SM) - Dark gray, mostly fine to medium sand, some low plasticity fines, some roots and decaying organics, wet, loose.	
				2			CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet, loose.	5-5-4 ▽
				3				4-4-5
				4			SANDY LEAN CLAY (CL) - Gray and orange (mottled), mostly low to medium plasticity fines, some fine sand, moist, firm to stiff.	5-6-6
				5			Boring terminated at 5 feet	8-10-12

NOTES:

LOG OF HAND AUGER HA-4

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

HAND AUGER LOG NO. HA-5

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

WATER LEVEL: **TOB = 4.5', 24 hrs = 2.5'**

DATE DRILLED: **1/27/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0				
							Fill - SILTY SAND (SM) - Reddish brown, mostly fine to medium sand, some low plasticity fines, wet, loose.	7-7-9
				1				9-8-9
				2			CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet to moist, very loose to loose.	6-6-7 ▼
				3				5-4-4 ▽
				4				5-6-7
							SANDY LEAN CLAY (CL) - Gray, mostly low to medium plasticity fines, some fine sand, moist, firm to stiff.	
				5			Boring terminated at 5 feet	6-7-9

This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

NOTES:

LOG OF HAND AUGER HA-5

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

HAND AUGER LOG NO. HA-6

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

DATE DRILLED: **1/28/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

WATER LEVEL: **TOB = 4.5', Borehole backfilled**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0			GABC - 7 1/4"	Kessler DCP
				1			**Fill** - SILTY SAND (SM) - Reddish brown and yellowish brown, mostly fine to medium sand, some low plasticity fines, some clayey inclusions, moist to wet.	Kessler DCP
				2			**Fill** - CLAYEY SAND (SC) - Yellowish brown, mostly fine to medium sand, some low to medium plasticity fines, wet to moist, loose.	9-8-9
				3				5-4-7
				4			CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet, very loose.	2-2-3
							SANDY LEAN CLAY (CL) - Gray, mostly low to medium plasticity fines, some fine sand, wet, soft.	
				5			Boring terminated at 5 feet	3-4-4

NOTES:

LOG OF HAND AUGER HA-6

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

HAND AUGER LOG NO. HA-7

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

DATE DRILLED: **1/28/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

WATER LEVEL: **TOB = 3.5', Borehole backfilled**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0			GABC - 7 1/4"	Kessler DCP
				1			**Topsoil** sampled as SILTY SAND (SM) - Dark gray, mostly fine to medium sand, some low to medium plasticity fines, some roots and organic matter, wet.	Kessler DCP
				2			CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet, very loose to loose.	2-3-2
				3				4-6-5 ▽
				4			SANDY LEAN CLAY (CL) - Gray, mostly low to medium plasticity fines, some fine sand, wet, firm to stiff.	5-5-6
				5			Boring terminated at 5 feet	8-8-10

NOTES:

LOG OF HAND AUGER HA-7

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

HAND AUGER LOG NO. HA-8

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

WATER LEVEL: **TOB = 4', Borehole backfilled**

DATE DRILLED: **1/28/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0			GABC - 11"	Kessler DCP
				1			**Fill** - SILTY SAND (SM) - Reddish brown and yellowish brown, mostly fine to medium sand, some low plasticity fines, moist to wet, loose.	Kessler DCP
				2			**Topsoil** sampled as CLAYEY SAND (SC) - Dark gray, mostly fine to medium sand, some low to medium plasticity fines, some roots, wet, very loose.	5-4-4
							CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet, very loose.	
				3				3-4-3
				4			SANDY LEAN CLAY (CL) - Gray, mostly low to medium plasticity fines, some fine sand, moist, firm.	3-4-5 ▽
				5			Boring terminated at 5 feet	6-6-7

NOTES:

LOG OF HAND AUGER HA-8

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

HAND AUGER LOG NO. HA-9

PROJECT: **Greenwood Convenience Center**
PROJECT NO: **1439-15-003**
PROJECT LOCATION: **Florence, SC**

WATER LEVEL: **TOB = 4', Borehole backfilled**

DATE DRILLED: **1/28/15**
DRILLING CONTRACTOR: **S&ME**
DRILLING METHOD: **Hand Auger**

GROUND SURFACE ELEVATION: **Unknown**
LOGGED BY: **W. Kannon**

This log is part of the report prepared for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.

SAMPLE NUMBER	SAMPLE ADVANCE (ft.)	OVA (ppm)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	DCP (blows per increment)
				0			GABC - 9 1/4"	Kessler DCP
				1			**Fill** - SILTY SAND (SM) - Reddish brown and yellowish brown, mostly fine to medium sand, some low plasticity fines, moist to wet.	Kessler DCP
							Topsoil sampled as CLAYEY SAND (SC) - Dark gray, mostly fine to medium sand, some low to medium plasticity fines, some roots, wet.	
				2			CLAYEY SAND (SC) - Gray, mostly fine to medium sand, some low to medium plasticity fines, wet, very loose.	3-4-4
				3				3-3-4
				4			SANDY LEAN CLAY (CL) - Gray, mostly low to medium plasticity fines, some fine sand, moist, very soft to soft.	2-2-2
				5			Boring terminated at 5 feet	3-3-4

NOTES:

LOG OF HAND AUGER HA-9

S&ME

HAND AUGER LOG 1439-15-003 GREENWOOD.GPJ WITH CPT.GDT 2/16/15

KESSLER DCP TEST RESULTS

Project Name: Greenwood Convenience Center
S&ME Project No.: 1439-15-003

Test Location: HA-6 **Date:** 1/28/2015 **Personnel:** WK/JM
Thickness of Stone (in): 7.25

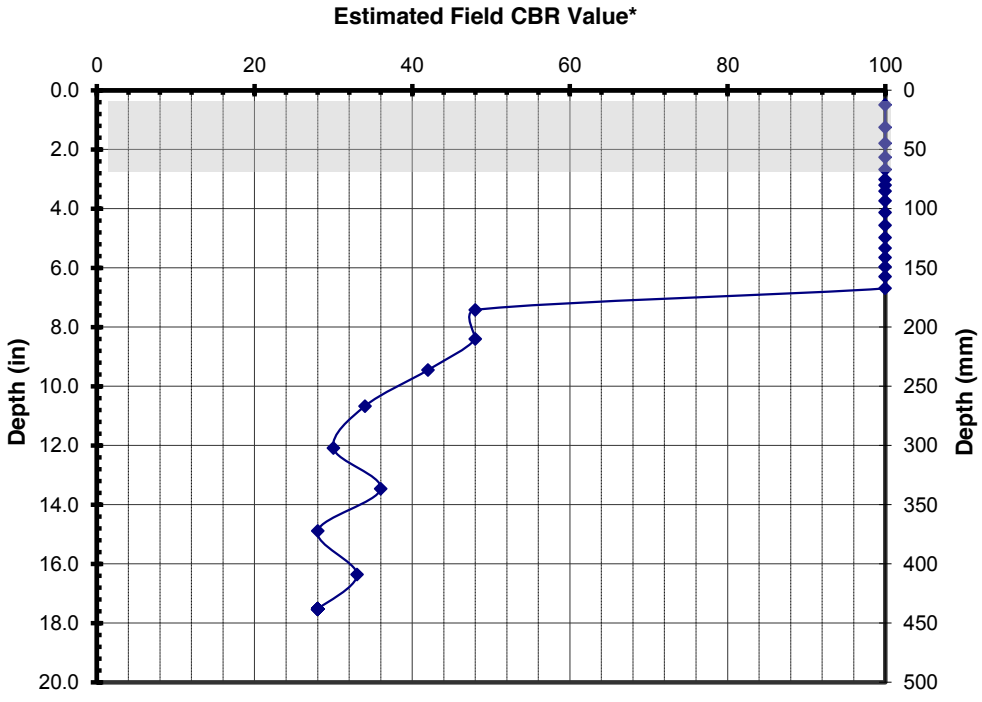
Test Data	
No. of Blows	Cummulative Penetration (mm)
10	25
10	39
10	52
10	63
10	73
10	80
10	83
10	90
10	100
10	110
10	122
10	131
10	140
10	147
10	156
10	164
5	176
5	201
5	226
5	254
5	288
5	326
5	358
5	398
5	433
3	457

CBR - DCP Correlation for Soil Subgrade

- ○ North Carolina Department of Transportation (Shin, et al 1989)
- ◉ U.S. Army Corps of Engineers (Webster, et al 1992)
- ○ Piedmont Residual Soils (Coonse 1999)

Test Summary

Stone		Soil Subgrade	
# Values	17	# Values	9
Average CBR	100	Average CBR	36
Weighted Average	100	Weighted Average	35
Max CBR	100	Max CBR	48
Min CBR	100	Min CBR	28



* Stone Field CBR estimated using published NCDOT relationship.
Subgrade Field CBR estimated using relationship indicated above.

KESSLER DCP TEST RESULTS

Project Name: Greenwood Convenience Center
S&ME Project No.: 1439-15-003

Test Location: HA-7 **Date:** 1/28/2015 **Personnel:** WK/JM
Thickness of Stone (in): 7.25

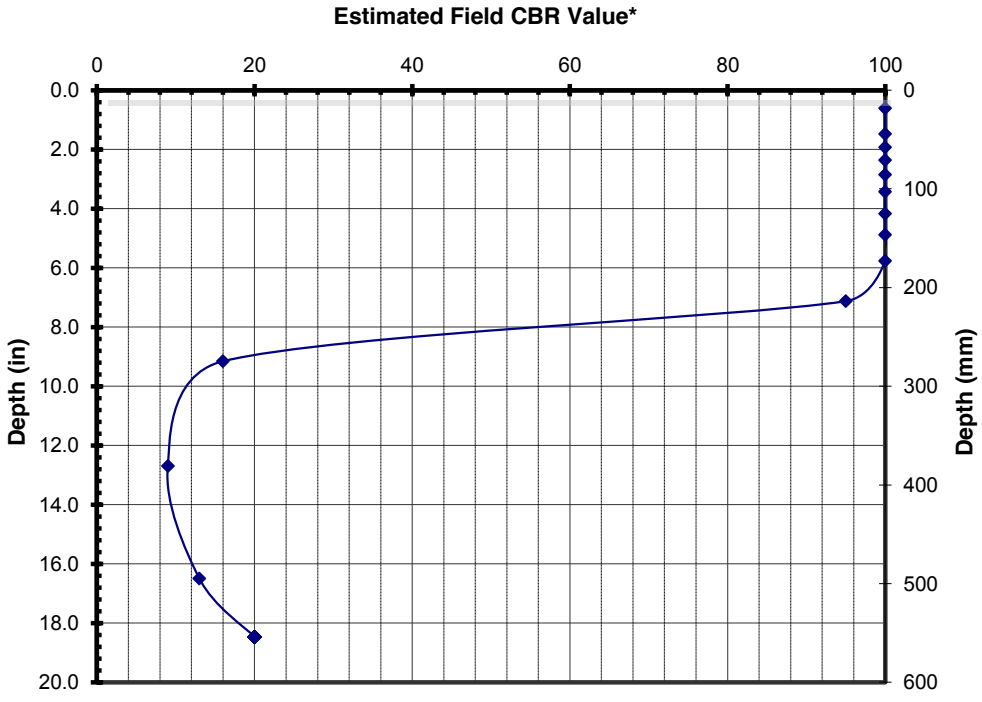
Test Data	
No. of Blows	Cummulative Penetration (mm)
10	31
10	44
10	54
10	66
10	79
10	95
10	117
10	131
10	162
10	200
5	265
5	380
5	458
2	480

CBR - DCP Correlation for Soil Subgrade

- ○ North Carolina Department of Transportation (Shin, et al 1989)
- ◉ U.S. Army Corps of Engineers (Webster, et al 1992)
- ○ Piedmont Residual Soils (Coonse 1999)

Test Summary

Stone		Soil Subgrade	
# Values	10	# Values	4
Average CBR	100	Average CBR	15
Weighted Average	99	Weighted Average	13
Max CBR	100	Max CBR	20
Min CBR	95	Min CBR	9



* Stone Field CBR estimated using published NCDOT relationship.
Subgrade Field CBR estimated using relationship indicated above.

KESSLER DCP TEST RESULTS

Project Name: Greenwood Convenience Center
S&ME Project No.: 1439-15-003

Test Location: HA-8 **Date:** 1/28/2015 **Personnel:** WK/JM
Thickness of Stone (in): 11

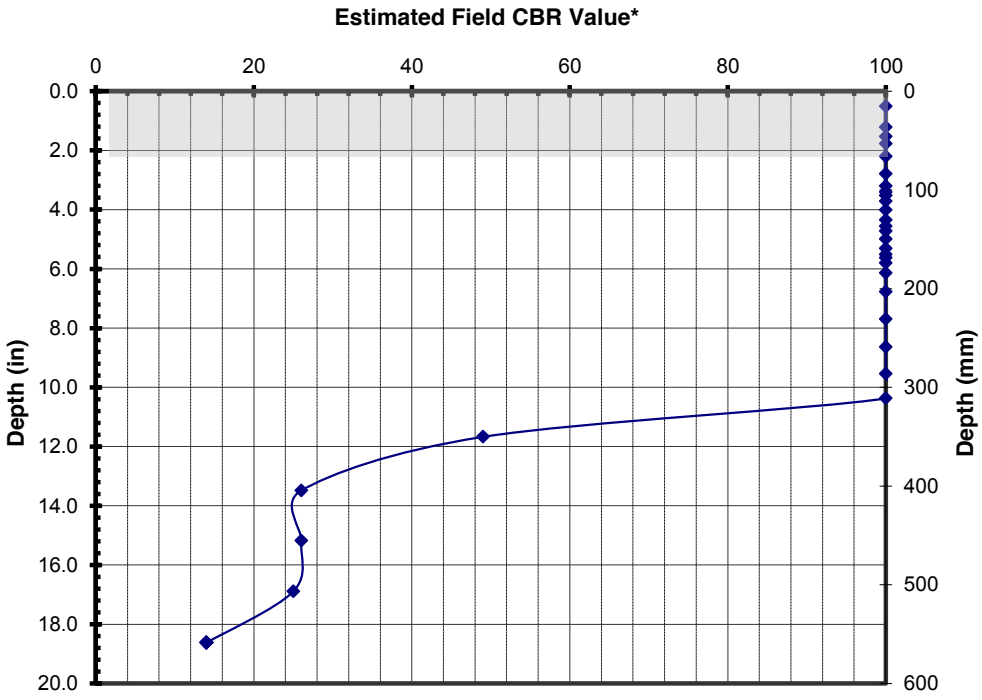
Test Data	
No. of Blows	Cummulative Penetration (mm)
10	26
10	36
10	42
10	48
10	64
10	78
10	85
10	88
10	91
10	98
10	106
10	115
10	117
10	123
10	131
10	139
10	141
10	145
10	150
10	162
10	182
10	209
10	230
10	255
10	272
10	321
5	364
5	407
5	451
3	495

CBR - DCP Correlation for Soil Subgrade

- ○ North Carolina Department of Transportation (Shin, et al 1989)
- ◉ U.S. Army Corps of Engineers (Webster, et al 1992)
- ○ Piedmont Residual Soils (Coonse 1999)

Test Summary

Stone		Soil Subgrade	
# Values	25	# Values	5
Average CBR	100	Average CBR	28
Weighted Average	100	Weighted Average	28
Max CBR	100	Max CBR	49
Min CBR	100	Min CBR	14



* Stone Field CBR estimated using published NCDOT relationship.
Subgrade Field CBR estimated using relationship indicated above.

KESSLER DCP TEST RESULTS

Project Name: Greenwood Convenience Center
S&ME Project No.: 1439-15-003

Test Location: HA-9 **Date:** 1/28/2015 **Personnel:** WK/JM
Thickness of Stone (in): 9.25

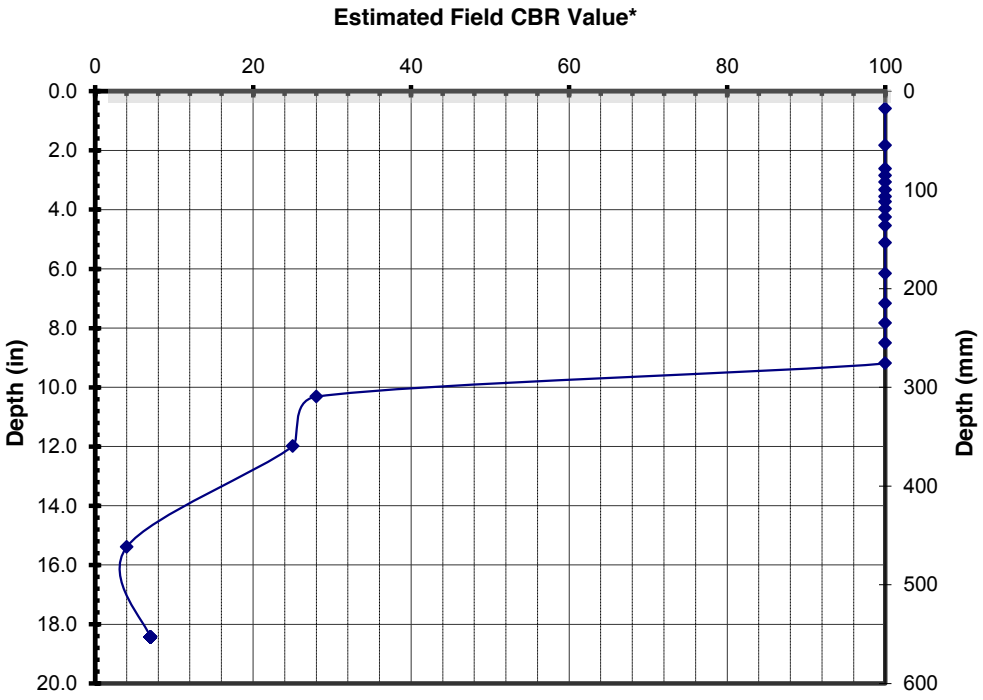
Test Data	
No. of Blows	Cummulative Penetration (mm)
10	30
10	63
10	70
10	75
10	81
20	88
10	93
10	97
20	105
10	111
10	120
20	140
20	173
20	191
20	207
10	225
10	242
5	282
5	327
3	455
1	482

CBR - DCP Correlation for Soil Subgrade

- ○ North Carolina Department of Transportation (Shin, et al 1989)
- ◉ U.S. Army Corps of Engineers (Webster, et al 1992)
- ○ Piedmont Residual Soils (Coonse 1999)

Test Summary

Stone		Soil Subgrade	
# Values	17	# Values	4
Average CBR	100	Average CBR	16
Weighted Average	100	Weighted Average	12
Max CBR	100	Max CBR	28
Min CBR	100	Min CBR	4



* Stone Field CBR estimated using published NCDOT relationship.
Subgrade Field CBR estimated using relationship indicated above.

SUMMARY OF LABORATORY PROCEDURES

Examination of Recovered Soil Samples

Soil and field records were reviewed in the laboratory by the geotechnical professional. Soils were classified in general accordance with the visual-manual method described in ASTM D 2488, "*Standard Practice for Description and Identification of Soils (Visual-Manual Method)*". Representative soil samples were selected for classification testing to provide grain size and plasticity data to allow classification of the samples in general accordance with the Unified Soil Classification System method described in ASTM D 2487, "*Standard Practice for Classification of Soils for Engineering Purposes*". The geotechnical professional also prepared the final boring and sounding records enclosed with this report.

Moisture Content Testing of Soil Samples by Oven Drying

Moisture content was determined in general conformance with the methods outlined in ASTM D 2216, "*Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil or Rock by Mass*." This method is limited in scope to Group B, C, or D samples of earth materials which do not contain appreciable amounts of organic material, soluble solids such as salt or reactive solids such as cement. This method is also limited to samples which do not contain contamination.

A representative portion of the soil was divided from the sample using one of the methods described in Section 9 of ASTM D 2216. The split portion was then placed in a drying oven and heated to approximately 110 degrees C overnight or until a constant mass was achieved after repetitive weighing. The moisture content of the soil was then computed as the mass of water removed from the sample by drying, divided by the mass of the sample dry, times 100 percent. No attempt was made to exclude any particular particle size from the portion split from the sample.

Grain Size Analysis of Samples

The distribution of particle sizes greater than 75 mm was determined in general accordance with the procedures described by ASTM D 421, "*Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants", and D 422, "Standard Test Method for Particle Size Analysis of Soils*," except that the hydrometer portion of the test standard was not utilized. During preparation samples were divided into two portions. The material coarser than the No. 30 U.S. sieve size fraction was dry sieved through a nest of standard sieves as described in Article 6. Material passing the No. 30 sieve was independently passed through a nest of sieves down to the No. 200 size.

Percent Fines Determination of Samples

A selected specimen of soils was washed over a No. 200 sieve after being thoroughly mixed and dried. This test was conducted in general accordance with ASTM D 1140, "*Standard Test Method for Amount of Material Finer Than the No. 200 Sieve*." Method A, using water to wash the sample through the sieve without soaking the sample for a prescribed period of time, was used and the percentage by weight of material washing through the sieve was deemed the "percent fines" or percent clay and silt fraction.

Liquid and Plastic Limits Testing

Atterberg limits of the soils was determined generally following the methods described by ASTM D 4318, "*Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils."* Albert Atterberg originally defined "limits of consistency" of fine grained soils in terms of their relative ease of deformation at various moisture contents. In current engineering usage, the *liquid limit* of a soil is defined as the moisture content, in percent, marking the upper limit of viscous flow and the boundary with a semi-liquid state. The *plastic limit* defines the lower limit of plastic behavior, above which a soil behaves plastically below which it retains its shape upon drying. The *plasticity index* (PI) is the range of water content over which a soil behaves plastically. Numerically, the PI is the difference between liquid limit and plastic limit values.

Representative portions of fine grained Group A, B, C, or D samples were prepared using the wet method described in Section 10.1 of ASTM D 4318. The liquid limit of each sample was determined using the multipoint method (Method A) described in Section 11. The liquid limit is by definition the moisture content where 25 drops of a hand operated liquid limit device are required to close a standard width groove cut in a soil sample placed in the device. After each

test, the moisture content of the sample was adjusted and the sample replaced in the device. The test was repeated to provide a minimum of three widely spaced combinations of N versus moisture content. When plotted on semi-log paper, the liquid limit moisture content was determined by straight line interpolation between the data points at N equals 25 blows.
The plastic limit was determined using the procedure described in Section 17 of ASTM D 4318. A selected portion of the soil used in the liquid limit test was kneaded and rolled by hand until it could no longer be rolled to a 3.2 mm thread on a glass plate. This procedure was repeated until at least 6 grams of material was accumulated, at which point the moisture content was determined using the methods described in ASTM D 2216.

Compaction Tests of Soils Using Modified Effort

Soil placed as engineering fill is compacted to a dense state to obtain satisfactory engineering properties. Laboratory compaction tests provide the basis for determining the percent compaction and water content needed to achieve the required engineering properties, and for controlling construction to assure the required compaction and water contents are achieved. Test procedures generally followed those described by ASTM D 1557, "*Modified Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (56,000 lbf/ft^3)."*

The relationship between water content and the dry unit weight is determined for soils compacted in a 4 inch diameter molds with a 10 lb rammer dropped from a height of 18 inches, producing a compactive effort of 56,000 lbf/ft^3.

Soil was compacted in the mold in five layers of approximately equal thickness, each compacted with 25 blows of the rammer. After compaction of the sample in the mold, the resulting dry density and moisture content was determined and the procedure repeated. Separate soils were used for each sample point, adjusting the moisture content of the soil as described in Section 10.2 (Moist Preparation Method). The procedure was repeated for a sufficient number of water content values to allow the dry density vs. water content values to be plotted and the *maximum dry density* and *optimum moisture content* to be determined from the resulting curvilinear relationship.

Laboratory California Bearing Ratio Tests of Compacted Samples

This method is used to evaluate the potential strength of subgrade, subbase, and base course material, including recycled materials, for use in road and airfield pavements. Laboratory CBR tests were run in general accordance with the procedures laid out in ASTM D 1883, "*Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils*." Specimens were prepared in standard molds using two different levels of compactive effort within plus or minus 0.5 percent of the optimum moisture content value. While embedded in the compaction mold, each sample was inundated for a minimum period of 96 hours to achieve saturation. During inundation the specimen was surcharged by a weight approximating the anticipated weight of the pavement and base course layers. After removing the sample from the soaking bath, the soil was then sheared by jacking a piston having a cross sectional area of 3 square inches into the end surface of the specimen. The piston was jacked 0.5 inches into the specimen at a constant rate of 0.05 inches per minute.

The CBR is defined as the load required to penetrate a material to a predetermined depth, compared to the load required to penetrate a standard sample of crushed stone to the same depth. The CBR value was usually based on the load ratio for a penetration of 0.10 inches, after correcting the load-deflection curves for surface irregularities or upward concavity. However, where the calculated CBR for a penetration of 0.20 inches was greater than the result obtained for a penetration of 0.10 inches, the test was repeated by reversing the specimen and shearing the opposite end surface. Where the second test indicated a greater CBR at 0.20 inches penetration, the CBR for 0.20 inches penetration was used.

Form No: TR-D2216-T265-1
Revision No. 0
Revision Date: 02/22/08

Laboratory Determination of Water Content

S&ME

ASTM D 2216 ☑ *AASHTO T 265* ☐ ***Quality Assurance***

S&ME, Inc. Florence, 2327 Prosperity Way Suite 9; Florence, SC 29501

Project #:	**1439-15-003**	Report Date:	02/11/15
Project Name:	Greenwood Convenience Center	Test Date(s):	02/06/15
Client Name:	Alliance Consulting Engineers, Inc.		
Client Address:	PO Box 8147; Columbia, SC 29202		
Sample by:	W. Kannon	Sample Date(s):	01/28/15
Sampling Method:	Grab	Drill Rig :	HA

Method: **A (1%)** ☐ **B (0.1%)** ☑ *Balance ID.* ***24496*** *Calibration Date:* ***11/5/13***

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture	Note
		ft. or m.		grams	grams	grams	grams	%	
BULK	1	1' - 2'	704	0.00	263.20	234.50	28.70	**12.2%**	
BULK	2	0 - 2'	703	0.00	331.70	286.50	45.20	**15.8%**	
HA-2	3	2' - 3'	89	0.00	345.80	287.30	58.50	**20.4%**	
HA-7	3	2' - 3'	69	0.00	322.70	265.90	56.80	**21.4%**	

Notes / Deviations / References

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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Material Finer than the #200 Sieve

ASTM D1140

Quality Assurance

S&ME, Inc. Florence, 2327 Prosperity Way Suite 9, Florence SC 29501

Project #:	**1439-15-003**	Report Date:	02/11/15
Project Name:	Greenwood Convenience Center	Test Date(s):	02/06/15
Client Name:	Alliance Consulting Engineers; INC.		
Client Address:	PO Box 8147; Columbia, SC 29202		
Sample by:	W. Kannon	Sample Date(s):	01/28/15
Sampling Method:	Grab	Drill Rig :	HA

Method; A ☐ **B** ☑ Soaked ☑ Soak Time 16 hrs.

Boring #	Sample #	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Tare Wt. + Dry Wt. after Wash	% Passing #200
		ft.		grams	grams	grams	grams	%
BULK	1	1' - 2'	704	0.00	0.00	113.30	78.70	**30.5%**
BULK	2	0 - 2'	703	0.00	0.00	128.20	105.40	**17.8%**
HA-2	3	2' - 3'	89	0.00	0.00	118.60	64.30	**45.8%**
HA-7	3	2' - 3'	69	0.00	0.00	131.40	68.30	**48.0%**

Balance ID. ***24496*** *Calibration Date:* ***11/11/15*** *#200 Sieve* ***24527*** *Calibration Date:* ***1/10/15***

Notes / Deviations / References: ASTM D1140: Amount of Material in Soil Finer Than the No. 200 (75-um)) Sieve

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

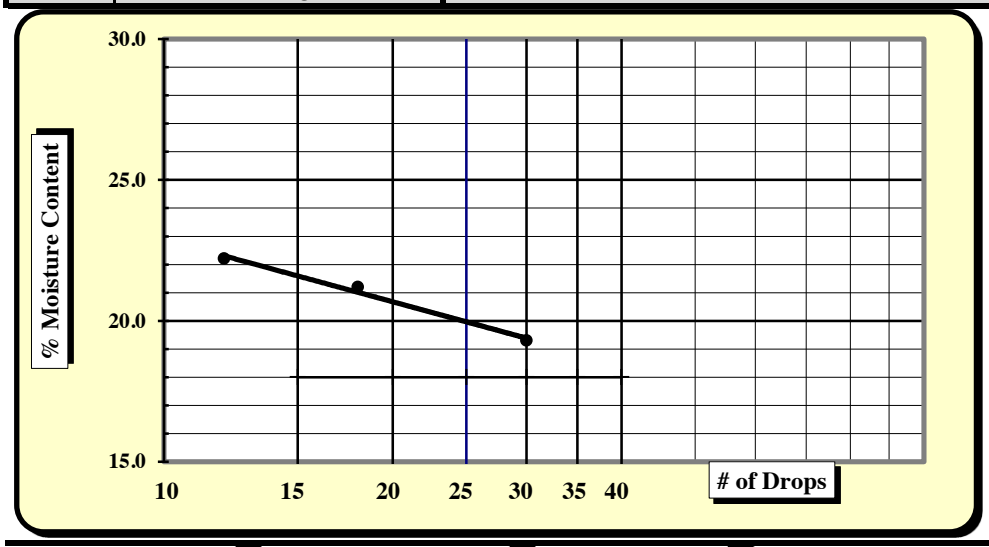
ASTM D 4318 ☒ *AASHTO T 89* ☐ *AASHTO T 90* ☐ ***Quality Assurance***

S&ME, Inc. Florence, 2327 Prosperity Way Suite 9; Florence, SC 29501

Project #:	**1439-14-003**	Report Date:	02/11/15
Project Name:	Greenwood Convenience Center	Test Date(s)	02/09/15
Client Name:	Alliance Consulting Engineers, INC.		
Client Address:	PO Box 8147; Columbia, SC 29202		
Boring #:	HA-6 thru HA-9	Sample #: 2227	Sample Date: 01/28/15
Location:	BULK 1		Depth: 1'-2'
Sample Description:	Brown Silty-Clayey Sand (SC-SM)		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	24496	11/11/2014	Grooving tool	24511	1/4/2015
LL Apparatus	24510	1/4/2015			
Oven	24456	1/10/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	50	51	52				53	54	
A	Tare Weight	15.30	15.08	15.14				15.50	19.41	
B	Wet Soil Weight + A	20.79	20.16	23.56				19.11	23.11	
C	Dry Soil Weight + A	19.90	19.27	22.03				18.63	22.61	
D	Water Weight (B-C)	0.89	0.89	1.53				0.48	0.50	
E	Dry Soil Weight (C-A)	4.60	4.19	6.89				3.13	3.20	
F	% Moisture (D/E)*100	19.3%	21.2%	22.2%				15.3%	15.6%	
N	# OF DROPS	30	18	12				*Moisture Contents determined by ASTM D 2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**15.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic ☐
Liquid Limit **20**
Plastic Limit **16**
Plastic Index **4**
Group Symbol **SC-SM**

Multipoint Method ☑
One-point Method ☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☐

Notes / Deviations / References:

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

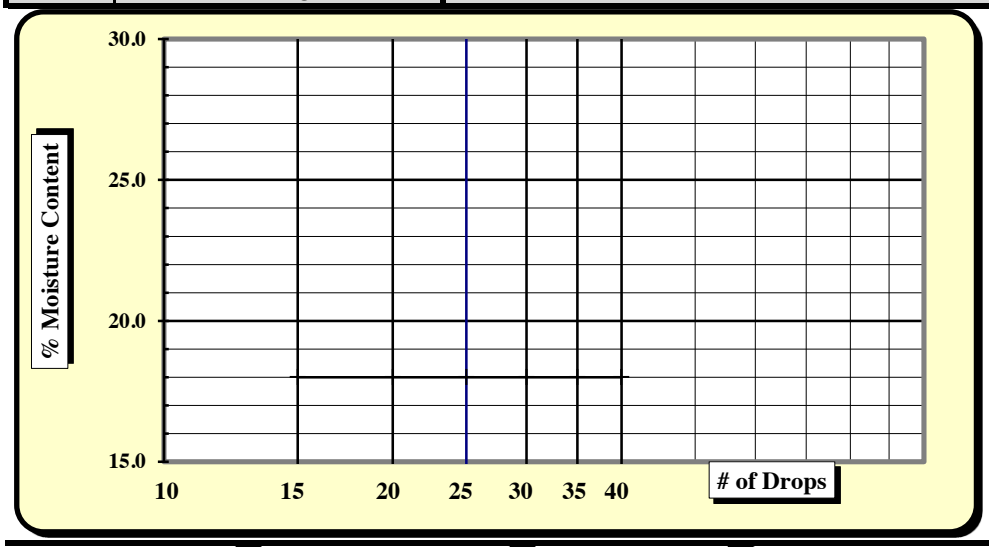
ASTM D 4318 ☒ *AASHTO T 89* ☐ *AASHTO T 90* ☐ ***Quality Assurance***

S&ME, Inc. Florence, 2327 Prosperity Way Suite 9; Florence, SC 29501

Project #:	**1439-14-003**	Report Date:	02/11/15
Project Name:	Greenwood Convenience Center	Test Date(s)	02/09/15
Client Name:	Alliance Consulting Engineers, INC.		
Client Address:	PO Box 8147; Columbia, SC 29202		
Boring #:	HA-1 thru HA-5	Sample #: 2228	Sample Date: 01/28/15
Location:	BULK 2		Depth: 0 - 2'
Sample Description:	Reddish Brown Silty Sand (SM)		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	24496	11/11/2014	Grooving tool	24511	1/4/2015
LL Apparatus	24510	1/4/2015			
Oven	24456	1/10/2015			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	50	51	52				53	54	
A	Tare Weight									
B	Wet Soil Weight + A									
C	Dry Soil Weight + A									
D	Water Weight (B-C)									
E	Dry Soil Weight (C-A)									
F	% Moisture (D/E)*100									
N	# OF DROPS							*Moisture Contents determined by ASTM D 2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*									



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☑
Liquid Limit	--
Plastic Limit	**NP**
Plastic Index	--
Group Symbol	**SM**
Multipoint Method	☐
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☐

Notes / Deviations / References:

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No: TR-D422-WH-1Ga
Revision No. 0
Revision Date: 07/14/08

Sieve Analysis of Soils

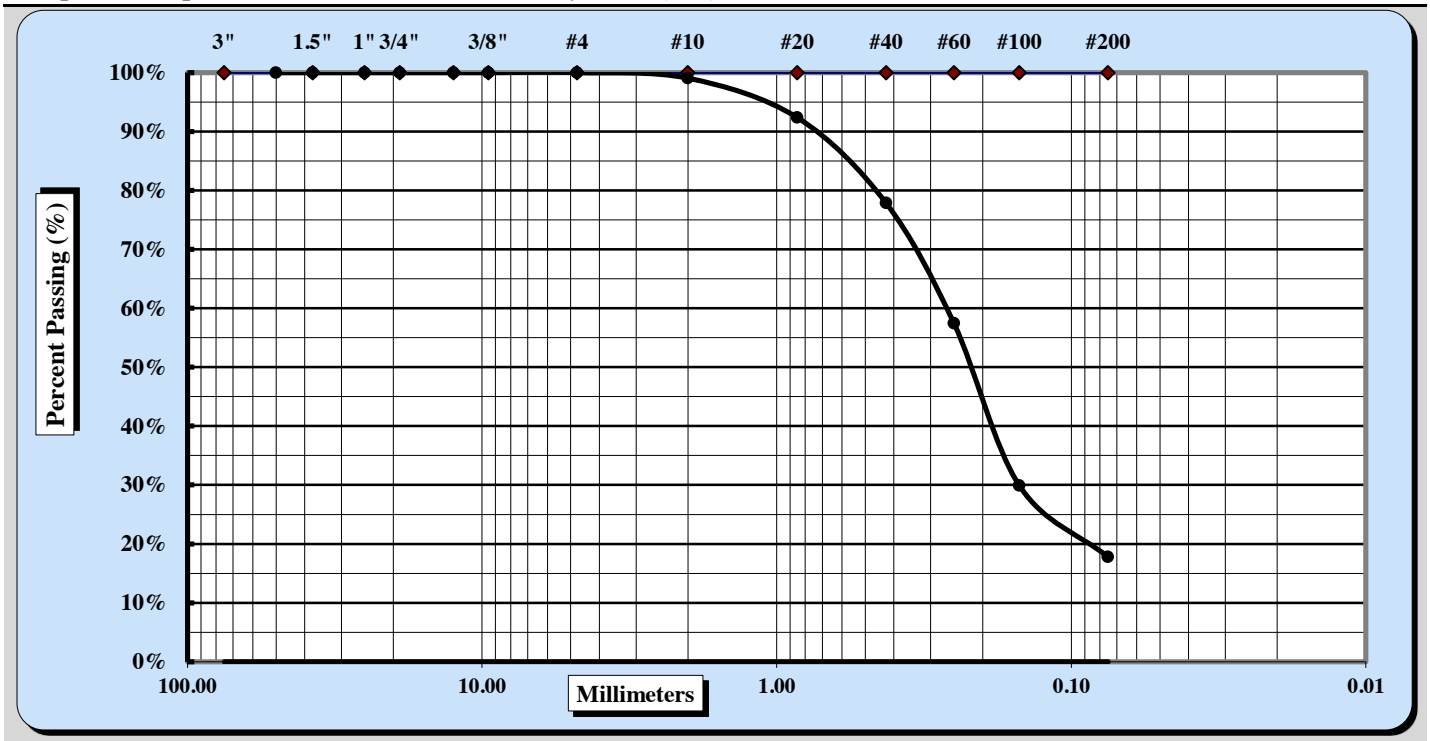
ASTM D 422

Quality Assurance

S&ME, Inc. - Florence, 2327 Prosperity Way Suite 9; Florence, SC 29501

Project #:	**1439-15-003**	Report Date:	2/11/15
Project Name:	Greenwood Convenience Center	Test Date(s):	2/6/15
Client Name:	Allience Consulting Engineers, INC.		
Client Address:	PO Box 8147; Columbia, SC 29202		
	Lab #: 2228	Sample Date:	1/28/15
Location:	BULK #2: HA-1 thru HA-5	Depth:	0 - 2'

Sample Description: Reddish Brown Silty Sand (SM)



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	2.000	Coarse Sand	0.9%	Fine Sand	60.1%
Gravel	0.0%	Medium Sand	21.2%	Silt & Clay	17.8%
Liquid Limit	---	Plastic Limit	NP	Plastic Index	---
Specific Gravity	N/D			Moisture Content	15.8%

Coarse Sand	0.9%	Medium Sand	21.2%	Fine Sand	60.1%

Description of Sand & Gravel Particles: Rounded ☐ Angular ☒
Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References:

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

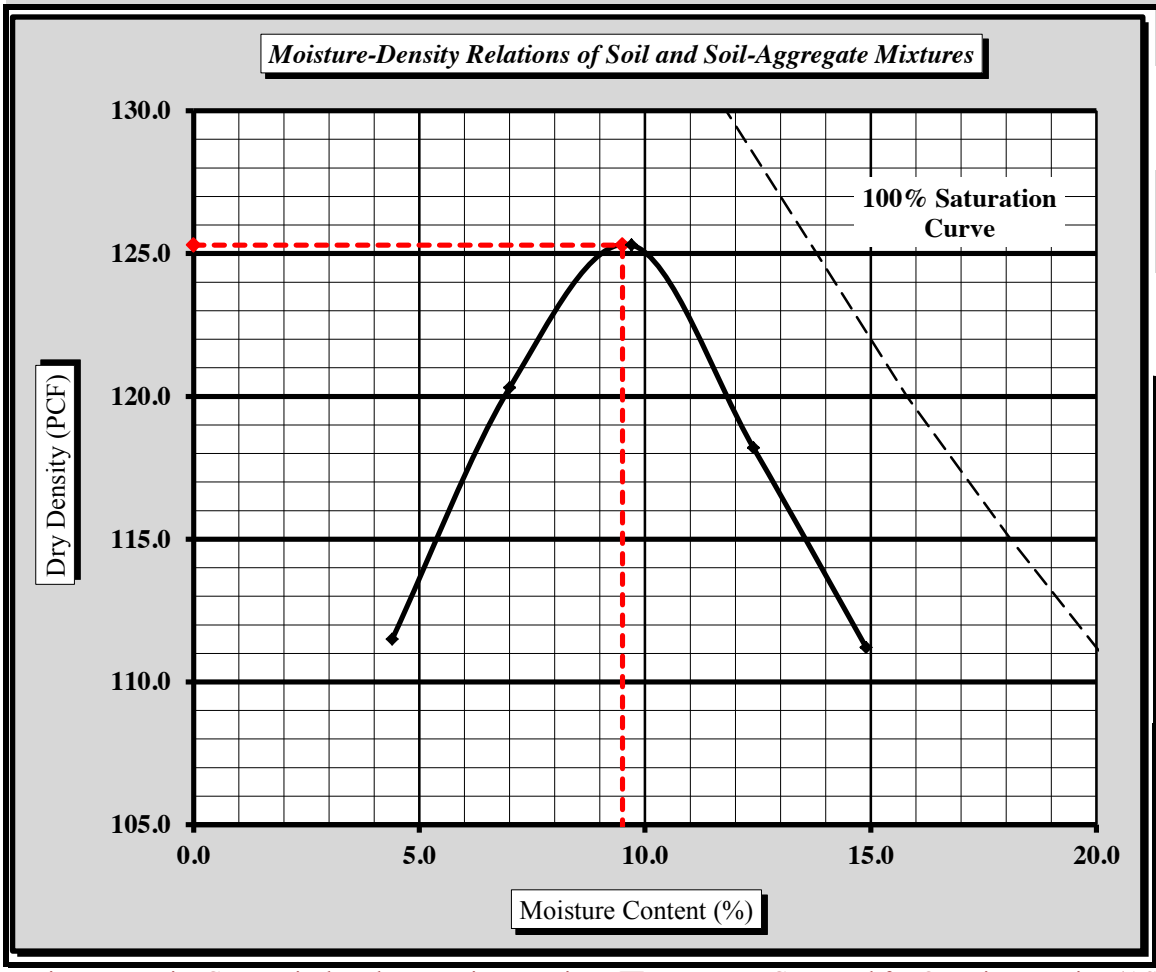
Quality Assurance

S&ME, Inc.- Florence 2327 Prosperity Way, Suite 9; Florence, SC 29501

S&ME Project #:	**1439-15-003**	Report Date:	2/11/15
Project Name:	Greenwood Convenience Center	Test Date(s):	2/6/15
Client Name:	Alliance Consulting Engineers, INC.		
Client Address:	PO Box 8147; Columbia,SC 29202		
	Lab # 2228	Sample Date:	1/28/2015
Location:	BULK #2: HA-1 thru HA-5	Depth:	0 - 2'
Sample Description:	Reddish Brown Silty Sand (SM)		

Maximum Dry Density **125.3** **PCF.** **Optimum Moisture Content** **9.7%**

ASTM D1557 - - Method A



Soil Properties	
Natural Moisture Content	**15.8%**
Specific Gravity of Soil	**--**
Liquid Limit	**20**
Plastic Limit	**16**
Plastic Index	**4**

% Passing	
3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.1%
#40	77.8%
#60	57.4%
#200	17.8%

Oversize Fraction	
Bulk Gravity	
% Moisture	--
% Oversize	#DIV/0!
MDD	
Opt. MC	

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations:

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D 1557: Laboratory Compaction Characteristics of Soil Using Modified Effort

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D1833-T193-3
Revision No. 0
Revision Date: 2/6/08
Modified

CBR (California Bearing Ratio) of Laboratory Compacted Soil

ASTM D 1883

Quality Assurance

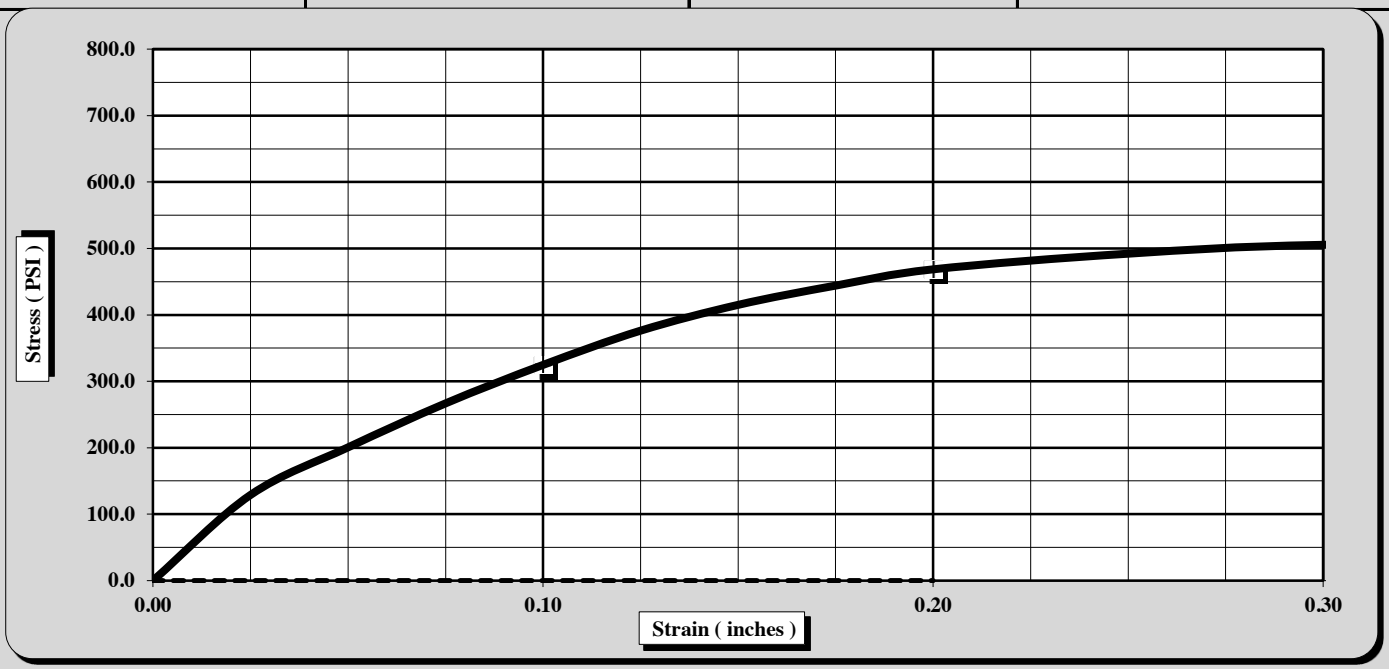
S&ME, Inc.Florence 2327 Prosperity Way, Suite 9; Florence, SC 29501

Project #:	**14396-15-003**	Report Date:	2/11/15
Project Name:	Greenwood Convenience Center	Test Date(s)	2/10/15
Client Name:	Alliance Consulting Engineers, INC.		
Client Address:	PO Box 8147; Columbia, SC 29202		
Boring #	HA-1 thru HA-5	Lab# 2228	Sample Date: 1/28/15
Location:	BULK #2		Depth: 0 - 2'
Sample Description:	Reddish Brown Silty Sand (SM)		

ASTM D1557 *Method A* Maximum Dry Density: **125.3** **PCF** Optimum Moisture Content: **9.7%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 32.5	**CBR at 0.2 in. 31.2**	**CBR at 0.1 in. 32.5**	**CBR at 0.2 in. 31.2**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with ASTM D1883, Section 6.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	28	Final Dry Density (PCF)	116.0
Initial Dry Density (PCF)	118.8	Average Final Moisture Content	12.4%
Moisture Content of the Compacted Specimen	9.7%	Moisture Content (top 1" after soaking)	14.1%
Percent Compaction	94.8%	Percent Swell	0.0%

Soak Time:	96 hrs.	Surcharge Weight	20.0	Surcharge Wt. per sq. Ft.	102.0
Liquid Limit	--	Plastic Index	NP	Apparent Relative Density	--

Notes/Deviations/References: Liquid Limit: ASTM D 4318, Classification: ASTM D 2487

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

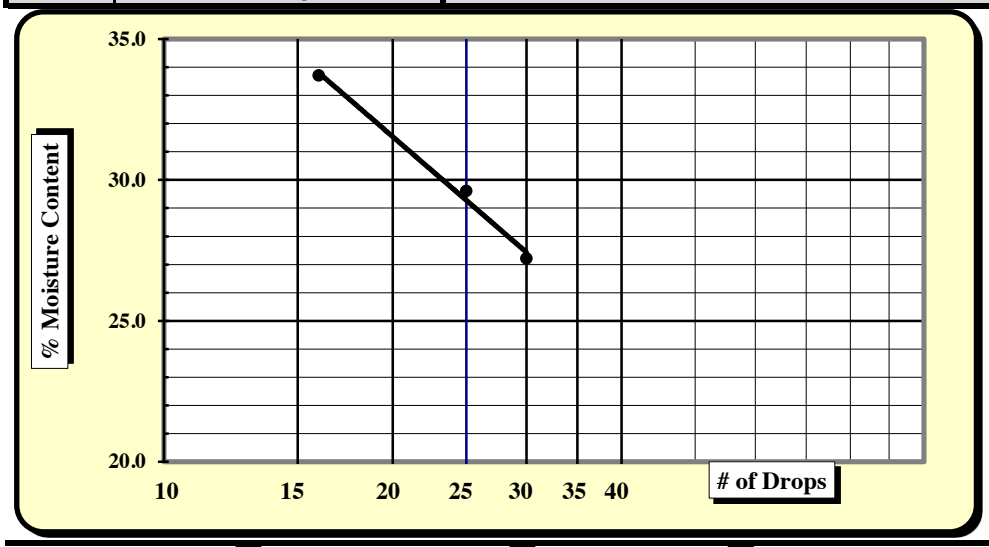
ASTM D 4318 ☒ *AASHTO T 89* ☐ *AASHTO T 90* ☐ ***Quality Assurance***

S&ME, Inc. Florence, 2327 Prosperity Way Suite 9; Florence, SC 29501

Project #:	**1439-15-003**	Report Date:	02/12/15
Project Name:	Greenwood Cooonvenience Center	Test Date(s)	02/09/15
Client Name:	Alliance Consulting Engineers, Inc.		
Client Address:	PO Box 8147; columbia, SC 29202		
Boring #:	HA-2	Sample #: 2229	Sample Date: 01/28/15
Location:	HA-2	Depth:	2' - 3'
Sample Description:	Gray Clayey Sand (SC)		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	24496	11/5/2013	Grooving tool	24511	1/4/2014
LL Apparatus	24510	1/4/2014			
Oven	24456	9/10/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	50	51	52				53	54	
A	Tare Weight	13.77	13.69	13.84				13.85	13.86	
B	Wet Soil Weight + A	22.79	21.23	22.92				16.82	16.86	
C	Dry Soil Weight + A	20.86	19.51	20.63				16.48	16.49	
D	Water Weight (B-C)	1.93	1.72	2.29				0.34	0.37	
E	Dry Soil Weight (C-A)	7.09	5.82	6.79				2.63	2.63	
F	% Moisture (D/E)*100	27.2%	29.6%	33.7%				12.9%	14.1%	
N	# OF DROPS	30	25	16				*Moisture Contents determined by ASTM D 2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**13.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**30**
Plastic Limit	**14**
Plastic Index	**16**
Group Symbol	**SC**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☐

Notes / Deviations / References:

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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Form No. TR-D4318-T89-90
Revision No. 0
Revision Date: 11/20/07

Liquid Limit, Plastic Limit, and Plastic Index

S&ME

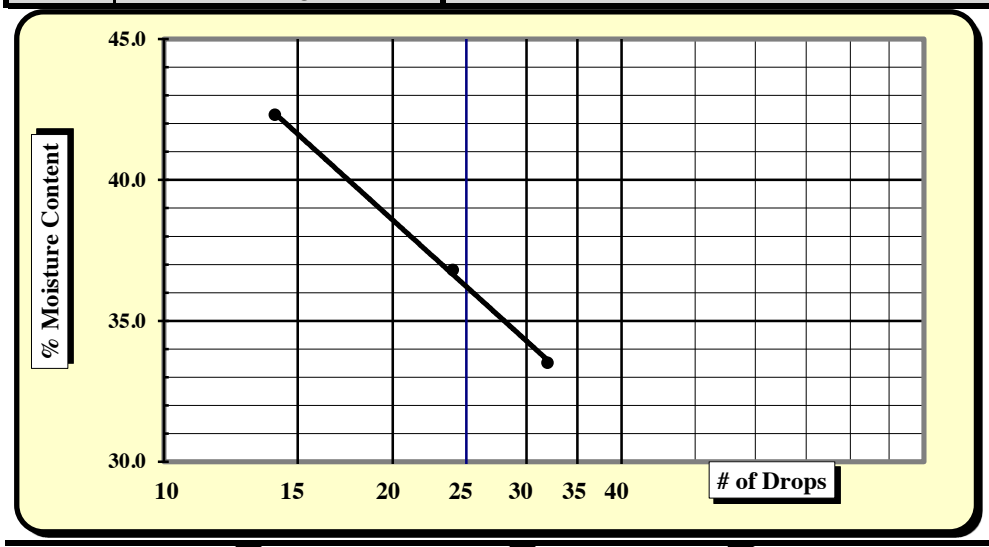
ASTM D 4318 ☒ *AASHTO T 89* ☐ *AASHTO T 90* ☐ ***Quality Assurance***

S&ME, Inc. Florence, 2327 Prosperity Way Suite 9; Florence, SC 29501

Project #:	**14329-15-003**	Report Date:	02/12/15
Project Name:	Greenwod Convenience Center	Test Date(s)	02/09/15
Client Name:	Alliance Consulting Engineers, Inc.		
Client Address:	PO Box 8147; Columbia, SC 29202		
Boring #:	HA-7	Sample #: 2230	Sample Date: 01/28/15
Location:	HA-7	Depth:	2' - 3'
Sample Description:	Gray Clayey Sand (SC)		

Type and Specification	*S&ME ID #*	*Cal Date:*	*Type and Specification*	*S&ME ID #*	*Cal Date:*
Balance (0.01 g)	24496	11/5/2013	Grooving tool	24511	1/4/2014
LL Apparatus	24510	1/4/2014			
Oven	24456	9/10/2014			

Pan #		Liquid Limit						Plastic Limit		
	Tare #:	50	51	52				10A	11	
A	Tare Weight	13.83	13.82	13.88				15.09	15.13	
B	Wet Soil Weight + A	18.21	23.27	22.36				18.58	18.04	
C	Dry Soil Weight + A	17.11	20.73	19.84				18.07	17.60	
D	Water Weight (B-C)	1.10	2.54	2.52				0.51	0.44	
E	Dry Soil Weight (C-A)	3.28	6.91	5.96				2.98	2.47	
F	% Moisture (D/E)*100	33.5%	36.8%	42.3%				17.1%	17.8%	
N	# OF DROPS	32	24	14				*Moisture Contents determined by ASTM D 2216*		
LL	LL = **F** * FACTOR									
Ave.	*Average*							**17.5%**		



One Point Liquid Limit			
N	**Factor**	**N**	**Factor**
20	0.974	26	1.005
21	0.979	27	1.009
22	0.985	28	1.014
23	0.99	29	1.018
24	0.995	30	1.022
25	1.000		

NP, Non-Plastic	☐
Liquid Limit	**36**
Plastic Limit	**18**
Plastic Index	**18**
Group Symbol	**SC**
Multipoint Method	☑
One-point Method	☐

Wet Preparation ☐ Dry Preparation ☑ Air Dried ☐

Notes / Deviations / References:

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

W. Kannon	WDK	Project Engineer	2/13/2015
Technical Responsibility	*Signature*	*Position*	*Date*

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SECTION 02100
SITE PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Clearing and protection of vegetation.

C. Removal of existing debris.

1.02 RELATED SECTIONS

A. Section 01700 - Execution and Closeout Requirements

B. Section 01710 – Construction Waste Management and Disposal

C. Section 02110 – Clearing and Grubbing

D. Section 02210 – Grading

E. Section 02221 – Excavation.

F. Section 02222 – Fill and Backfill

G. Section 02270 – Erosion and Sediment Control

1.03 REFERENCES

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2009.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Vegetation removal limits.
   2. Areas for temporary construction and field offices.
   3. Areas for temporary and permanent placement of removed materials.

C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.05 PROJECT CONDITIONS

A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

B. Comply with other requirements specified in Section 01700.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 02210 – Grading

PART 3 EXECUTION

3.01 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least seven (7) days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least three (3) days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.02 VEGETATION

A. Scope: Remove trees, shrubs, brush, and stumps in areas to be improved.

B. Do not begin clearing until vegetation to be relocated has been removed.

C. Do not remove or damage vegetation beyond the following limits:
   1. Limits of Disturbance as illustrated on Construction Drawings
   2. 25 feet outside perimeter of pervious paving areas that must not be compacted by construction traffic.
   3. Exception: Specific trees and vegetation indicated on drawings to be removed.
   4. Exception: Selective thinning of undergrowth specified elsewhere.

D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.

E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   4. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
   5. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.

F. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.

G. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.03 DEBRIS

A. Remove debris, junk, and trash from site.

3.04 WASTE REMOVAL

A. Remove from site all materials not to be reused on site; comply with requirements of Section 01710 - Waste Management.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

3.04 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02110
CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: Remove all organic vegetative mater as required to complete the construction is indicated on the construction plans.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, Sections in Division 1 of these Specifications.
   2. Section 02100 - Site Preparation.
   3. Section 02270 - Erosion and Sediment Control.
   4. Section 02930 - Grassing.

1.02 QUALITY ASSURANCE

A. Use required number of workmen that are properly trained and have experience in the crafts and who are completely familiar with the specified requirements herein and the methods for proper performance of the work specified in this section.

B. Use the proper equipment that is adequate in size, capacity and numbers to accomplish the work within the timeframe of the Project schedule.

C. Comply with requirements of governmental agencies having jurisdiction within the Project area.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 AREA INCLUDED

A. All areas where new construction is taking place, or as illustrated on the plans.

3.02 PROCEDURES

A. Clearing and grubbing: The entire area within the limits described above shall be cleared and grubbed.

B. Areas that are to be selectively cleared shall consist of removing vegetation, brush, stumps, etc., from the area. Special care shall be taken to avoid damage to trees that are left. Grubbing will not be required in areas designated for selective clearing.

C. Removal of trees and shrubs: All trees being taken down must be removed avoiding damage to trees and existing features that are to remain. All parts of the trees being removed are to be completely taken from the site and properly disposed of. Any shrubs or small trees that are undesirable may be selectively removed as directed.

D. Stumps and roots: All stumps and roots larger than 2-inches in diameter shall be completely removed by grubbing except in areas of building site, parking areas and drives; they must be cut off no less than 18-inches below any subgrade. The area of operation then shall be cleared of resulting debris and matted roots, weeds and other organic matter shall be hauled away from the site. Generally, all material that cannot be compacted to 90-percent maximum density in lawn areas and 95-percent of maximum density elsewhere must be removed.

E. Protection of trees: Trees that are to remain in place will need to be protected in areas where earthwork cut or fill is eighteen inches or less and in existing parking areas. Contractor must obtain approval from Engineer prior to removal of significant trees covered by local tree ordinances. Existing trees that are remaining in place during and after construction must be protected by constructing barricades around each tree.

F. Erosion and Sediment Control: Construct and maintain erosion and sediment control devices as illustrated on the construction plans and in accordance with Section 02260 of these specifications.

3.03 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02210

GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work included: Cut, fill, excavate, backfill, compact and grade the site as necessary to bring the roads, drives, paved areas and open areas to the lines and grades shown on the drawings.
   1. The work includes, but is not necessarily limited to:
      a. Building site preparation.
      b. Roadway, parking area, drive and walk subgrade preparation.
      c. Dressing of graded areas, shoulders and ditches.
      d. Construction and lining of stormwater basins.
   2. Subsurface Classification: All excavation is unclassified and excavation of every description, regardless of material encountered within the grading limits of the project, shall be performed to the lines and grades indicated.

B. Removal and storage of topsoil.

C. Rough grading the site for improvements.

D. Topsoil and finish grading.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 01 of these specifications.

B. Section 02100 - Site Preparation

C. Section 02110 - Clearing and Grubbing

D. Section 02221 - Excavation

E. Section 02222 - Fill and Backfill

F. Section 02223 - Trenching

G. Section 02230 - Aggregate Base Course

H. Section 02270 - Erosion and Sediment Control

I. Section 02930 - Grassing

1.03 DEFINITIONS:

A. Open areas: Open areas shall be those areas that do not include building sites, paved areas, street right-of-way and parking areas.

B. Maximum density: Maximum weight in pounds per cubic foot of a specific material.

C. Optimum moisture: Percentage of water in a specific material at maximum density.

D. Muck: Materials unsuitable for foundation because of organic content, saturation to the extent that it is somewhat fluid and must be removed by dragline, dredge or other special equipment, are designated as muck. No extra payment will be made for muck removal.

E. Unsuitable material: Unsuitable material is defined as earth material unsatisfactory for its intended use and as classified by the soils technician. In addition to organic matter, sod, muck, roots and rubbish, highly plastic clay soils of the CH and MH descriptions, and organic soils of the OL and OH descriptions, as defined in the Unified Soil Classification System shall be considered as unsuitable material.

F. Suitable material: Where the term suitable material is used in specification sections pertaining to earthwork, it means earth or materials designated as being suitable for their intended use by soils technicians or the Engineer. Suitable material shall be designated as meeting the requirements of the Unified Soil Classification System types SW, GW, GC, SC, SM, ML, CL or as designated in these specifications.

G. Select material: Select material is defined as granular material to be used where indicated on the drawings or where specified herein consisting of soils conforming to the Unified Soil Classification types SW, SM, GW or GM or as otherwise approved by the Engineer as select fill. Select material shall contain no stones or rubble larger than 1-1/2-inches in diameter.

H. Crushed stone (gravel): Crushed stone shall be No. 57 aggregate or equal conforming to ASTM C-33.

I. Excavation: Excavation is defined as unclassified excavation of every description regardless of materials encountered.

1.04 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with the South Carolina Department of Health and Environmental Control (SCDHEC) standards.
   1. Maintain one copy on site.

B. 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.

C. Comply with requirements of governmental agencies having jurisdiction.

D. A testing laboratory retained by the Owner will make such tests as are deemed advisable. The Contractor shall schedule his work so as to permit a reasonable time for testing before placing succeeding lifts of fill material and shall keep the laboratory informed of his progress. The cost of the initial tests shall be paid for by the Owner. Subsequent tests required as a result of improper compaction shall be paid for by the Contractor.

1.06 PROJECT CONDITIONS

A. Protect above- and below-grade utilities that remain.

B. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from grading equipment and vehicular traffic.

C. The Contractor must determine for himself the volume of material required by the site.

1.07 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

1.08 JOB CONDITIONS

A. Notification of intent to excavate:
   1. South Carolina Underground Utility Damage Prevention Act (S.C. Code Ann, 58-35-10, CT-SEQ, Supp. 1978) requires persons to ascertain the location of underground public utility property prior to excavation or demolition in certain situations. The Act also requires such persons to give timely notice of intent to excavate or demolish prior to commencing such operations. Failure to comply could subject the violator to a civil penalty of up to one thousand dollars ($1,000) for each violation of the Act.
   2. Notification of intent to excavate may be given by calling this toll free number: 811.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

A. General:
   1. Soil material used as fill, backfill, subgrade for structures or pavements, embankments, or site grading shall consist of suitable material as found available on site until such supply of on-site material is depleted.
      a. Provide suitable material free from organic matter and deleterious substances, containing no rocks or lumps over 6-inches in greatest dimension, and with not more

than 15-percent of the rocks or lumps larger than 2-1/2-inches in their greatest dimension.

b. Do not permit rocks having a dimension greater than 1-inch in the upper 6-inches of fill or embankment.

2. Should the quantity of suitable on-site material be insufficient to complete the work, suitable borrow material as approved by the Engineer shall be provided by the Contractor at no additional expense to the Owner.
3. Select materials may be provided from on-site if acceptable material as approved by the Engineer is available on site. Otherwise approved select material shall be provided by the Contractor from an off-site source

B. Topsoil:
1. Use topsoil consisting of material removed from the top 3-inches to 6-inches of existing on-site soils.
2. Use topsoil containing no stones, roots or large clods of soil.
3. Stockpile topsoil separate from other excavated material.

C. Other Fill Materials:

2.02 SPECIAL SOIL MATERIALS

A. Provide basin liner soils consisting of fine grained soils selected from excavated area or approved borrow sites, stockpiled and then placed and compacted in areas to receive liner.

B. Sufficient material for the liner, as selected by the Engineer, shall be stockpiled, kept separate from other excavated materials and piled free of undesirable materials.

2.03 WEED KILLER

A. Provide a dry, free-flowing, dust free chemical compound, soluble in water, capable of inhibiting growth of vegetation and approved for use on this work by governmental agencies having jurisdiction.

2.04 EQUIPMENT

A. Use equipment adequate in size, capacity and numbers to accomplish the work in a timely manner without undue waste or damage of material.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Surface Conditions:
1. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

E. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

F. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

G. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

H. Clearing and grubbing: Clear and grub areas to be graded prior to commencement of the grading operations.

I. Where so directed by the Owner, protect and leave standing designated desirable trees.

J. Complete any demolition and/or removal work as may be required prior to grading operations.

K. Dispose of all clearing, grubbing and demolition debris and other deleterious material off the project site. Vegetation, roots, brush, rubbish, stumps, etc. may be burned on-site where permitted by local authorities and regulations and approved by the Engineer.

L. Topsoil: Strip topsoil to a depth of 3-inches to 6-inches without contamination from the subsoil and stockpile topsoil separate from other excavated materials.
   1. Transport and deposit topsoil in storage piles convenient to areas that are to receive topsoil or in other locations as indicated or approved by the Engineer.
   2. Deposit topsoil in areas that are already graded and will not be disturbed by on-going construction.
   3. Dispose of unsuitable or unusable stripped material off-site or as otherwise directed by the Engineer.

M. Sampling and preliminary testing:
   1. Prior to beginning the grading operations, the Contractor shall submit to the Engineer his proposed sequence of excavation operations.
   2. Based upon the sequence of excavation, samples of the fill materials will be obtained as excavation proceeds and tested for grain size permeability and moisture density relationship using the Standard Proctor Method (ASTM D698, Method A).
   3. Allow sufficient time for completion of laboratory tests before any fill operations begin, using the soils being tested.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. Perform excavating of every type of material encountered within the limits of the Work to the lines, grades and elevations indicated and specified herein.

G. Suitable excavated materials:
   1. Use all suitable materials removed from the excavation as far as practicable in the formation of the embankments, subgrades, shoulders, building sites and other places as directed.
   2. Unless otherwise indicated on the drawings or approved by the Engineer, surplus suitable material shall be removed from the site and disposed of by the Contractor.

H. Unsuitable excavated material: Remove from the site and dispose of all unsuitable material unless otherwise approved by the Engineer.

I. Unauthorized excavation:
   1. Excavation of material to depths below the grades indicated unless so directed by the Engineer will be deemed unauthorized excavation.
   2. Unauthorized overexcavation shall be backfilled and compacted without any additional expense to the Owner.

J. In the event that it is necessary to remove unsuitable material to a depth greater than that shown on the drawings or otherwise specified, the Contractor, upon receiving direction from the Engineer, shall remove, replace and compact such material as directed by the Engineer at no additional expence by the Owner.

K. Filling and Backfilling
   1. Use fills formed of suitable material placed in layers of not more than 8-inches in depth measured loose and rolled and/or vibrated with suitable equipment until compacted.
   2. Do not place rock that will not pass through a 6-inch diameter ring within the top 12-inches of the surface of the completed fill or rock that will not pass through a 2-inch diameter ring within the top 6-inches of the completed fill.
   3. Do not use broken concrete or asphaltic pavement in fills.
   4. Selection of borrow material:
      a. Material in excess of that available on the site shall be suitable material furnished by the Contractor from private sources selected by the Contractor. The material shall be approved by the Engineer before use. All expenses involved in securing, developing, transporting and placing the material shall be borne by the Contractor.

L. Placing and compacting:
   1. Place backfill and fill materials in layers not more than 8-inches in loose depth.
   2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
   3. Compact each layer to required percentage of maximum density for the area.
   4. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
   5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
   6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structures to approximately the same elevation in each lift.

M. Moisture control:
   1. Do not use soil material that is either too dry or too wet to achieve proper compaction.
   2. Where subgrade or layer of soil material is too dry to achieve proper compaction, uniformly apply water to surface of soil material such that free water does not appear on the surface during or subsequent to compacting operations.
   3. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
   4. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the Engineer.

N. Compaction requirements:
   1. Compact soils to not less than the following percentages of maximum dry density as determined in accordance with ASTM D698, Method A (Standard Proctor).
   2. Beneath Roadways:
      a. Top 12-inches of Subgrade 98%
      b. All other fill material 95%
   3. Embankments:
      a. Top 12-inches of Subgrade 98%
      b. All other fill material 95%
   4. Lawns and unpaved areas:
      a. All other fill material 90%

O. Placing of Special Materials:
   1. Placing impervious liner materials:
      a. Place selected fine grain soils on bottom and side slopes of the basin to the indicated depth.
      b. Inspect and proofroll the stripped and grubbed subgrade prior to placement of any liner material, as specified hereinafter.
      c. Spread liner material in 8-inches maximum, loose lift thickness to provide a 6-inches compacted lift thickness.

d. Adjust soil moisture content to 1 to 3 percentage points "wet" of the optimum moisture contents.
e. Compact at 98-percent of maximum density.
f. Maintain liner material sufficiently moist to prevent drying and cracking, until such time as the basin is filled.

P. See Section 02222 for filling procedures.

Q. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.04 SOIL REMOVAL

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

3.05 FINISH GRADING

A. General:
1. Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas.
2. Smooth the finished surfaces within specified tolerance.
3. Grade with uniform levels or slopes between points where elevations are shown on the drawings, or between such points and existing grades.
4. Where a change of slope is indicated on the drawings, construct a rolled transition section having a minimum radius of approximately 8-feet and 0-inches, unless adjacent construction will not permit such a transition, or if such a transition defeats positive control of drainage.

B. Before Finish Grading:
1. Verify building and trench backfilling have been inspected.
2. Verify subgrade has been contoured and compacted.

C. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

D. Grading adjacent to structures: Grade areas adjacent to buildings to achieve drainage away from the structures and to prevent ponding.

E. Ditches and gutters and swales:
1. Cut accurately to the cross sections, grades and elevations shown.
2. Maintain excavations free from detrimental quantities of leaves, sticks, trash and other debris until completion of the work.
3. Dispose of excavated materials as specified herein; do not in any case deposit materials within 3-feet and 0-inches of the edge of a ditch.

F. Upon completion of site grading and other related site work, topsoil shall be uniformly spread over the graded or improved areas. Topsoil shall be evenly distributed to conform to final grade elevations shown on the plans.

G. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.

H. Place topsoil to the following compacted thicknesses:
1. Areas to be Seeded with Grass not less than: 3 inches.
2. Areas to be Sodded: 4 inches.
3. Shrub Beds: 18 inches.
4. Flower Beds: 12 inches.

I. Place topsoil during dry weather.

J. Remove roots, weeds, rocks, and foreign material while spreading topsoil.

K. Near plants spread topsoil manually to prevent damage.

L. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

M. Lightly compact placed topsoil.

N. Any surplus topsoil materials shall be disposed of in approved areas on the site.

3.06 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.07 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Engineer as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

D. Construct areas outside of building or structure lines true to grades shown.
   1. Where no grade is indicated, shape finish surface to drain away from buildings or structures, as approved by the Engineer.

E. Degree of finish shall be that ordinarily obtainable from bladegrader, supplemented with hand raking and finishing.

3.08 FIELD QUALITY CONTROL

A. See Section 02222 for compaction density testing and the following:

B. Secure the Engineer's construction review and observation and approval of subgrades and fill layers before subsequent construction is permitted thereon.

C. Field density determinations will be made, at no cost to the Contractor, to ensure that the specified densities are being obtained. Field density tests will be performed as determined by the Engineer, considering the following:
   1. At areas to receive paving, at least one field density test for every 5,000 sq. ft. of subgrade area, but not less than three tests.
   2. In each compacted fill layer, one field density test for every 5,000 sq. ft. of overlaying paved area, but not less than three tests.
   3. In fill beneath structures, one field density test for every 2,500 sq. ft. in each layer.
   4. Other tests as deemed necessary by the Engineer.

D. If, in the Engineer's opinion based on reports of the testing laboratory, subgrade or fills which have been placed are below specified density, provide additional compacting and testing until specified requirements are met.
   1. Additional testing will be provided by the Owner's selected testing laboratory and all costs for the additional testing will be borne by the Contractor.

E. Proofrolling:
   1. The Contractor shall proofroll subgrade of areas to receive paving, structures on fill or impervious lining material.
      a. Make not less than three (3) passes of a 25 to 50 ton rubber tired roller over the full area.
      b. Unstable, soft or otherwise unsuitable materials revealed by the proofrolling shall be removed and replaced with satisfactory materials, compacted as specified herein.

3.09 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

C. Existing utilities:

1. Unless shown to be removed, locate and protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
2. If active utility lines are encountered and are not shown on the drawings or otherwise made known to the Contractor, promptly notify the Engineer and take necessary steps to assure that service is not interrupted.
3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.
5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.

D. Protection of persons and property:
1. Barricade open holes and depressions occurring as part of this Work, and post warning lights on property adjacent to or with public access.
2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout and other hazards created by operations under this Section.

E. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

F. Maintain access to adjacent areas at all times.

G. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

3.10 MAINTENANCE

A. Protection of newly graded areas:
1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
2. Repair and re-establish grades in settled, eroded and rutted areas to the specified tolerances.

B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

3.11 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the items under this Section and all costs for same shall be included in the lump sum for the line item.

END OF SECTION

SECTION 02221
EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for Roadway and Storm Drainage.

B. Trenching for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 01 of these Specifications

B. Section 01700 - Execution and Closeout Requirements

C. Section 02100 - Site Preparation

D. Section 02210 - Grading

E. Section 02222 – Fill and Backfill

F. Section 02270 - Erosion and Sediment Control

G. Section 02271 - Riprap

H. Section 02635 - Storm Drainage Piping

1.03 PROJECT CONDITIONS

A. Verify that survey benchmarks and intended elevations for the Work are as indicated.

B. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

1.04 CLASSIFICATION:

A. Classification: All excavation is unclassified and excavation of every description, regardless of material encountered within the excavation limits of the structure, shall be performed to the lines and grades indicated.

1.05 DEFINITIONS:

A. Open areas: Open areas shall be those areas that do not include building sites, paved areas, street right-of-way and parking areas.

B. Maximum density: Maximum weight in pounds per cubic foot of a specific material.

C. Optimum moisture: Percentage of water in a specific material at maximum density.

D. Muck: Materials unsuitable for foundation because of organic content, saturation to the extent that it is somewhat fluid and must be moved by dragline, dredge, or other special equipment, are designated as muck. No extra payment will be made for muck removal.

E. Unsuitable material: Unsuitable material is defined as earth material unsatisfactory for its intended use and as classified by the soils technicians. In addition to organic matter, sod, muck, roots, and rubbish, highly plastic clay soils of the CH and MH descriptions, and organic soils of the OL and OH descriptions, as defined in the Unified Soil Classification System shall be considered as unsuitable material.

F. Suitable material: Where the term suitable material is used in specification sections pertaining to earthwork, it means earth or materials designated as being suitable for their intended use by soils technicians or the Engineer. Suitable material shall be designated as meeting the requirements of the Unified Soil Classification System types SW, GW, GC, SC, SM, ML, Cl or as designated in these specifications.

G. Select material: Select material is defined as granular material to be used where indicated on the drawings or where specified herein consisting of soils conforming to the Unified Soil

Classification types SW, SM, GW, or GM or as otherwise approved by the Engineer as select fill. Select material shall contain no stones or rubble larger than 1-1/2-inches in diameter.

H. Crushed stone (gravel): Crushed stone shall be No. 57 aggregate or equal conforming to ASTM C 33.

I. Excavation: Excavation is defined as unclassified excavation of every description regardless of materials encountered.

1.06 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. Comply with requirements of governmental agencies having jurisdiction.

C. Testing: A testing laboratory retained by the Owner will make such tests as are deemed advisable.
   1. Schedule fill and backfill operations so as to permit a reasonable time for inspection and testing before placing succeeding lifts and keep the laboratory and Engineer informed of progress.
   2. Notify the Engineer and allow sufficient time for observation and/or testing of foundation subgrades prior to commencing any work on the exposed excavation.
   3. Contractor shall be responsible for coordination and fees associated with Construction Materials Testing Services associated with the Construction of the proposed Speculative Building.

1.07 JOB CONDITIONS

A. If conditions encountered during construction warrant additional removal of unsuitable material below foundation subgrades, then remove unsuitable material and replace it as specified at no additional expense to the Owner.

1.08 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 02210 for additional requirements.

C. Locate, identify, and protect utilities that remain and protect from damage.

D. Notify utility company to remove and relocate utilities.

E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

F. Protect plants, lawns, rock outcroppings, and other features to remain.

3.03 EXCAVATING

A. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for piling.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Cut utility trenches wide enough to allow inspection of installed utilities.

F. Hand trim excavations. Remove loose matter.

G. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.

H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 02222.

I. Conform to elevations and dimensions shown within a tolerance of 0.10-feet, and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, installation of services, other construction required and for construction observation.

J. Where earth will stand, shallow footing excavations may be cut to the exact size of the footing.

K. Separate suitable materials and stockpile for future use.

L. Grade top perimeter of excavation to prevent surface water from draining into excavation.

M. Remove excavated material that is unsuitable for re-use from site.

N. Stockpile excavated material to be re-used in area designated on site in accordance with Section 02210.

O. Remove excess excavated material from site.

3.04 FOUNDATION SUBGRADES

A. Excavate foundations and footings to a level bottom in firm, solid, suitable material.

B. Take care not to disturb the bottom of the excavation unless further compaction of the subgrade is required.

C. Notify the Engineer in due time to permit observation of the completed excavation prior to performing work on the foundation subgrade.

D. Should unsuitable or soft material be encountered at subgrade elevation, remove such material and replace with compacted suitable material or crushed stone from firm earth up to the indicated elevation.
   1. In wet excavations or where groundwater is normally present, replace unsuitable material with crushed stone or lean concrete.
   2. In dry excavations above the normal groundwater level, replace unsuitable material with compacted suitable material.
   3. Unsuitable material shall be removed and replaced at no expense to the Owner.
   4. Where rock is encountered at foundation level:
      a. Use drilling, picking, wedging or similar methods leaving the foundation rock in an entirely solid and unshattered condition.
      b. Roughen approximately level surfaces to provide satisfactory bond with concrete.
      c. Cut steps or benches in sloped surfaces to provide satisfactory bond.

3.05 DRAINAGE

A. Provide drainage and control grading in the vicinity of the work to prevent drainage into the excavation.

3.06 UNAUTHORIZED EXCAVATION

A. Excavation of material to depths below the grades indicated unless so directed by the Engineer will be deemed unauthorized excavation.

B. Backfill and compact unauthorized over excavation at no expense to the Owner.
   1. In wet excavations or excavations below normal groundwater elevations: Use crushed stone or lean concrete as directed by the Engineer.
   2. In dry excavations above normal groundwater elevations: Use compacted suitable material.

3.07 DEWATERING

A. Remove all surface and subsurface waters from excavations and maintain the excavation in a dry condition during construction operations.

B. Maintain the water level below the excavation subgrade during excavation and construction.
   1. Material disturbed below the foundation subgrade due to improper dewatering shall be removed and replaced with crushed stone or lean concrete at no expense to the Owner.
   2. Use sumps, pumps, drains, trenching or well point system as necessary to maintain a dry excavation.
   3. Dewatering by trench pumping will not be permitted if migration of fine grained natural material (running sand) from bottom, side walls or bedding material will occur.

C. Dispose of water pumped from excavations in storm drains having capacity, canals, trenches or other approved locations.
   1. Contractor is responsible for acquiring all permits required to discharge the water and shall protect waterways from turbidity during the operation.
   2. Prevent flooding of streets, roadways, or private property.
   3. Provide engines driving dewatering pumps with residential type mufflers.

3.08 FIELD QUALITY CONTROL

A. See Section 01400 – Quality Requirements for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.09 PROTECTION

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout and other hazards created by operations under this Section.

D. Unless shown to be removed, locate and protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.

E. If active utility lines are encountered and are not shown on the drawings or otherwise made known to the Contractor, promptly notify the Engineer and take necessary steps to assure that service is not interrupted.

F. Barricade open holes and depressions occurring as part of this work, and post warning lights on property adjacent to or with public access. Operating warning lights during hours from dusk to dawn each day and as otherwise required.

G. Side slopes: Slope, bench and/or shore sides of excavations and trench walls to maintain stability of the wall or sides. Pile materials obtained from the excavation a minimum of four feet from the edge of the excavation.

H. Shoring and sheeting: Where necessary, shore and sheet excavations with members of sizes and arrangement sufficient to prevent injury to persons, damage to structures or injurious caving or erosion.
   1. Furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures from undermining or other damage. Any movement or bulging that may occur shall be corrected immediately by the Contractor. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and compacted.
   2. Take all precautions to prevent distress of existing structures because of sheeting installation or removal. Where the removal of sheeting may cause damage to existing or newly constructed structures, such sheeting shall be left in place at no expense to the Owner.

3. All sheeting and shoring operations and maintenance thereof shall be the responsibility of the Contractor.

3.10 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02222
FILL AND BACKFILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for building volume below grade.

B. Backfilling and compacting for utilities outside the building to utility main connections.

C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 1 of these Specifications.

B. Section 02100 - Site Preperation.

C. Section 02210 - Grading.

D. Section 02221 - Excavation.

E. Section 02271 - Riprap.

F. Sectoin 02635 - Storm Drainage Piping

G. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2010 (2009).

B. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2006.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

D. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

H. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

I. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

J. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2010.

1.04 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: Indicated on drawings.

C. Open areas: Open areas shall be those areas that do not include building sites, paved areas, street right-of-way and parking areas.

D. Maximum density: Maximum weight in pounds per cubic foot of a specific material.

E. Optimum moisture: Percentage of water in a specific material at maximum density.

F. Muck: Materials unsuitable for foundation because of organic content, saturation to the extent that it is somewhat fluid and must be moved by dragline, dredge, or other special equipment, are designated as muck. No extra payment will be made for muck removal.

G. Unsuitable material: Unsuitable material is defined as earth material unsatisfactory for its intended use and as classified by the soils technicians. In addition to organic matter, sod, muck, roots, and rubbish, highly plastic clay soils of the CH and MH descriptions, and organic soils of the OL and OH descriptions, as defined in the Unified Soil Classification System shall be considered as unsuitable material.

H. Suitable material: Where the term suitable material is used in specification sections pertaining to earthwork, it means earth or materials designated as being suitable for their intended use by soils technicians or the Engineer. Suitable material shall be designated as meeting the requirements of the Unified Soil Classification System types SW, GW, GC, SC, SM, ML, Cl or as designated in these specifications.

I. Select material: Select material is defined as granular material to be used where indicated on the drawings or where specified herein consisting of soils conforming to the Unified Soil Classification types SW, SM, GW, or GM or as otherwise approved by the Engineer as select fill. Select material shall contain no stones or rubble larger than one and one half (1-1/2) inches in diameter.

J. Crushed stone (gravel): Crushed stone shall be No. 57 aggregate or equal conforming to ASTM C 33.

1.05 SUBMITTALS

A. See Section 01300 - Submittal procedures.

B. Samples: 10 lb sample of each type of fill; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

E. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

C. Verify that survey bench marks and intended elevations for the Work are as indicated.

1.07 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. Comply with requirements of governmental agencies having jurisdiction.

C. Testing: A testing laboratory retained by the Owner will make such tests as are deemed advisable.
   1. Schedule fill and backfill operations so as to permit a reasonable time for inspection and testing before placing succeeding lifts and keep the laboratory and Engineer informed of progress.
   2. Notify the Engineer and allow sufficient time for observation and/or testing of foundation subgrades prior to commencing any work on the exposed excavation.

1.08 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

PART 2 PRODUCTS

2.01 SOIL MATERIALS GENERAL

A. Soil material used as fill, backfill or subgrade for structures shall consist of suitable material.
   1. Provide suitable material free from organic matter and deleterious substances, containing no rocks or lumps over six (6) inches in greatest dimension, and with not more than 15-percent of the rocks or lumps larger than two and one half (2-1/2) inches in their greatest dimension.
   2. Do not permit rocks having a dimension greater than one (1) inch in the upper six (6) inches of fill or subgrade.

B. Where select material is indicated on the drawings or specified, use select granular material as defined herein and approved by the Engineer.

C. Where indicated on the drawings or specified, use gravel or crushed stone as defined herein.

2.02 FILL MATERIALS

A. General Fill: Subsoil excavated on-site.
   1. Graded.
   2. Free of lumps larger than three (3) inches, rocks larger than two (2) inches, and debris.
   3. Conforming to ASTM D2487 Group Symbol CL.

B. Granular Fill - Fill Type No. 57: Coarse aggregate, conforming to State of South Carolina Highway Department standard.

C. Granular Fill - Gravel: Pit run washed stone; free of shale, clay, friable material and debris.
   1. Graded in accordance with ASTM D2487 Group Symbol GW.
   2. Graded in accordance with ASTM C136, within the following limits:
      a. 2 inch sieve: 100 percent passing.
      b. 1 inch sieve: 95 percent passing.
      c. 3/4 inch sieve: 95 to 100 percent passing.
      d. 5/8 inch sieve: 75 to 100 percent passing.
      e. 3/8 inch sieve: 55 to 85 percent passing.
      f. No. 4 sieve: 35 to 60 percent passing.
      g. No. 16 sieve: 15 to 35 percent passing.
      h. No. 40: 10 to 25 percent passing.
      i. No. 200: 5 to 10 percent passing.

D. Granular Fill - Pea Gravel: Natural stone; washed, free of clay, shale, organic matter.
   1. Grade in accordance with ASTM D2487 Group Symbol GM.
   2. Graded in accordance with ASTM C136, within the following limits:
      a. Minimum Size: 1/4 inch.
      b. Maximum Size: 5/8 inch.

E. Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
   1. Grade in accordance with ASTM D2487 Group Symbol SW.
   2. Graded in accordance with ASTM C136; within the following limits:
      a. No. 4 sieve: 100 percent passing.
      b. No. 14 sieve: 10 to 100 percent passing.
      c. No. 50 sieve: 5 to 90 percent passing.
      d. No. 100 sieve: 4 to 30 percent passing.
      e. No. 200 sieve: 0 percent passing.

F. Topsoil: Topsoil excavated on-site.
   1. Select.
   2. Graded.

3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
4. Acidity range (pH) of 5.5 to 7.5.
5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.
6. Conforming to ASTM D2487 Group Symbol OH.

2.03 SOURCE QUALITY CONTROL

A. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

B. If tests indicate materials do not meet specified requirements, change material and retest.

C. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. See Section 02210 for additional requirements.

D. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

E. Verify structural ability of unsupported walls to support imposed loads by the fill.

F. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.

3.02 PREPARATION

A. Scarify subgrade surface to a depth of six (6) inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING AND BACKFILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

H. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Fill with concrete.
   2. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

J. Reshape and re-compact fills subjected to vehicular traffic.

K. Use suitable material for all filling and backfilling operations.

L. Fill under structures: Deposit suitable material in layers not exceeding 8" in depth and compact each layer using proper equipment.

1. Do not place rock that will not pass through a six (6) inch diameter ring within the top twelve (12) inches of the surface of the completed fill or rock that will not pass through a two (2) inch diameter ring within the top six (6) inches of the completed fill.
2. Do not place broken concrete, bricks, or asphaltic pavement in fills.
3. Where indicated on the drawings, provide select granular material.

M. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:
1. Inspection and acceptance of construction below finish grade including, where applicable, damp proofing and waterproofing.
2. Inspecting, testing, approving and recording locations of underground utilities.
3. Removing concrete formwork.
4. Removing shoring and bracing, and backfilling of voids with satisfactory materials.
5. Removing trash and debris.
6. Foundation walls have been in place seven days.

N. Placing and compacting:
1. Place backfill and fill materials in layers not more than eight (8) inches in loose depth.
2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content within ± 2-percent.
3. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
4. Place backfill and fill materials evenly adjacent to structures, to required elevations.
5. Do not operate heavy equipment closer to foundation or retaining walls than a distance equal to height of backfill above the footing.
    a. Compact remaining area using power driven hand tampers.

3.04 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:
1. Drainage fill and geotextile fabric.
2. Cover drainage fill with general fill.
3. Fill up to subgrade elevation.
4. Compact to 95 percent of maximum dry density.

C. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
1. Bedding: Use general fill.
2. Cover with general fill.
3. Fill up to subgrade elevation.
4. Compact in maximum eight (8) inch lifts to 95 percent of maximum dry density.

D. Inside Planter Boxes:
1. Use granular fill, 4 inches deep.
2. Cover with geotextile fabric.
3. Cover with sand, 2 inches deep.
4. Finish with topsoil, to within 2 inches of planter rim, lightly tamped.

E. At Lawn Areas:
1. Use general fill.
2. Fill up to six (6) inches below finish grade elevations.
3. Compact to 95 percent of maximum dry density.
4. See Section 31 22 00 for topsoil placement.

F. At Planting Areas Other Than Lawns:
1. Use general fill.
2. Fill up to 12 inches below finish grade elevations.
3. Compact to 95 percent of maximum dry density.
4. See Section 31 22 00 for topsoil placement.

3.05 COMPACTION REQUIREMENTS

A. Compact soils to not less than the following percentages of maximum dry density as determined in accordance with ASTM D698, Method A (Standard Proctor) in 8-inch lifts.

B. Existing in place subgrade below structures where subgrade has been disturbed by water, improper dewatering, or construction traffic.
   1. Top twelve (12) inches of subgrade: 98%
   2. Below top twelve (12) inches of subgrade:98%

C. Compaction of suitable material used to replace unsuitable material below foundation subgrades:
   1. Top twelve (12) inches of subgrade: 98%
   2. Below top twelve (12) inches of subgrade:98%

3.06 BACKFILLING, FILLING AND COMPACTION

A. Use suitable material for all filling and backfilling operations.

B. Fill under structures: Deposit suitable material in layers not exceeding 8" in depth and compact each layer using proper equipment.
   1. Do not place rock that will not pass through a six (6) inch diameter ring within the top 12-inches of the surface of the completed fill or rock that will not pass through a three (3) inch diameter ring within the top six (6) inches of the completed fill.
   2. Do not place broken concrete, bricks, or asphaltic pavement in fills.
   3. Where indicated on the drawings, provide select granular material.

C. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:
   1. Inspection and acceptance of construction below finish grade including, where applicable, damp proofing and waterproofing.
   2. Inspecting, testing, approving and recording locations of underground utilities.
   3. Removing concrete formwork.
   4. Removing shoring and bracing, and backfilling of voids with satisfactory materials.
   5. Removing trash and debris.
   6. Foundation walls have been in place seven days.

D. Placing and compacting:
   1. Place backfill and fill materials in layers not more than eight (8) inches in loose depth.
   2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content within ± 2-percent.
   3. Compact each layer to required percentage of maximum density for area.
   4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
   5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
   6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
   7. Do not operate heavy equipment closer to foundation or retaining walls than a distance equal to height of backfill above the footing.
      a. Compact remaining area using power driven hand tampers.
   8. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.

3.07 TOLERANCES

A. Top Surface of General Filling: Plus or minus one (1) inch from required elevations.

B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.08 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests:
   1. At areas to receive paving, at least one field density test for every 5000 sq.ft. of subgrade area, but not less than three tests.
   2. In each compacted fill layer, one field density test for every 5000 sq.ft. of overlaying paved area, but not less than three tests.
   3. In fill beneath structures, one field density test for every 2500 sq.ft. in each layer.
   4. Other tests as deemed necessary by the Engineer.

F. If, the Engineer's opinion based on reports of the testing laboratory, subgrade or fills that have been placed are below specified density, provide additional compacting and testing until specified requirements are met.
   1. Additional testing will be provided by the Owner's selected testing laboratory and all costs for the additional testing will be borne by the Contractor.

G. Proofrolling:
   1. Upon request by the Engineer, proofroll the subgrade of structure foundations.
      a. Make not less than three passes of a 25 to 50 ton rubber tired roller over the full area.
      b. Unstable, soft or otherwise unsuitable materials revealed by the proofrolling shall be removed and replaced with satisfactory material and compacted as specified herein.

H. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

I. Proof roll compacted fill at surfaces that will be under slabs-on-grade.

3.09 DEWATERING

A. Remove all surface and subsurface waters from excavations and maintain the excavation in a dry condition during construction operations.

B. Maintain the water level below the excavation subgrade during excavation and construction.
   1. Material disturbed below the foundation subgrade due to improper dewatering shall be removed and replaced with crushed stone or lean concrete at no expense to the Owner.
   2. Use sumps, pumps, drains, trenching or well point system as necessary to maintain a dry excavation.
   3. Dewatering by trench pumping will not be permitted if migration of fine grained natural material (running sand) from bottom, side walls or bedding material will occur.

C. Dispose of water pumped from excavations in storm drains having capacity, canals, trenches or other approved locations.
   1. Contractor is responsible for acquiring all permits required to discharge the water and shall protect waterways from turbidity during the operation.
   2. Prevent flooding of streets, roadways, or private property.
   3. Provide engines driving dewatering pumps with residential type mufflers.

3.10 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.
   1. Unstable, soft or otherwise unsuitable materials revealed by the proofrolling shall be removed and replaced with satisfactory material and compacted as specified herein.

C. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

3.11 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the items under this Section and all costs for same shall be included in the lump sum price for the line item.

END OF SECTION

SECTION 02223
TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling and compacting for underground utilities.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 01 of these Specifications.

B. Section 02210 - Grading.

C. Section 02221 - Excavation.

D. Section 02222 - Fill and Backfill.

1.03 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: Indicated on drawings.

1.04 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2010 (2009).

B. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2006.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

D. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

H. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

I. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

J. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2010.

K. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Samples: 10 lb sample of each type of fill; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

E. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

C. Verify that survey bench marks and intended elevations for the Work are as indicated.

D. Protect plants, lawns, rock outcroppings, and other features to remain.

E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

1.07 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. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.

1.08 JOB CONDITIONS

A. Existing utilities:
   1. Approximate location of certain underground lines and structures are shown on the plans for information only, other underground lines or structures are not shown.
   2. Locate these and other possible unknown utility lines using electronic pipe finder, or other approved means.
   3. Locate, excavate and expose all existing underground lines in advance of trenching operations.
   4. The Contractor will be held responsible for the workmanlike repair of any damage done to any of these utilities in the execution of his work under this Section.
   5. The Contractor shall familiarize himself with the existing conditions and be prepared to adequately care for and safeguard himself and the Owner from damage.

B. Notification of intent to excavate:
   1. South Carolina Underground Utility Damage Prevention Act (S.C. Code Ann, 58-35-10, CT-SEQ, Supp. 1978) requires persons to ascertain the location of underground public utility property prior to excavation or demolition in certain situations. The Act also requires such persons to give timely notice of intent to excavate or demolish prior to commencing such operations. Failure to comply could subject the violator to a civil penalty of up to one thousand dollars ($1,000) for each violation of the Act.
      a. Notification of intent to excavate may be given by calling this toll free number: 811.

C. Protecting trees, shrubbery and lawns:
   1. Trees and shrubbery in developed areas and along the trench line shall not be disturbed unless absolutely necessary, and subject to the approval of the Engineer.
      a. Any such trees and shrubbery necessary to be removed shall be heeled in and replanted.
   2. Where trenches cross private property through established lawns, sod shall be cut, removed, stacked and maintained in suitable condition until replacement is approved by the Engineer.
      a. Topsoil underlying lawn areas shall be removed and kept separate from general excavated materials.

D. Clearing:
   1. Perform all clearing necessary for installation of the complete work.
   2. Clearing shall consist of removing all trees, stumps, roots, brush and debris in the rights-of-way obtained for the Work.

3. All timber of merchantable size shall remain the property of the Owner and shall be trimmed and cut in such lengths as directed and stacked along the edge of the right-of-way.
4. All other material, including trimmings from above, shall be completely disposed of in a satisfactory manner.

E. Removing and resetting fences:
1. Where existing fences must be removed to permit construction of utilities:
a. Remove such fences and, as the Work progresses, reset the fences in their original location and condition.
b. Provide temporary fencing or other safeguards as required to prevent stock and cattle from wandering to other lands.

F. Restoration of disturbed areas:
1. Restore all areas disturbed by, during or as a result of construction activities to their existing or better condition.
2. Do not interpret this as requiring replacement of trees and undergrowth in undeveloped sections of the rights-of-way.

G. Minimizing silting and bank erosion during construction:
1. During construction, protective measures shall be taken and maintained to minimize silting and bank erosion of creeks and rivers adjacent to the work being performed during construction.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill: Subsoil excavated on-site.
1. Graded.
2. Free of lumps larger than three (3) inches, rocks larger than two (2) inches, and debris.
3. Conforming to ASTM D 2487 Group Symbol CL.

B. Granular Fill - Fill Type No. 57: Coarse aggregate, conforming to State of South Carolina Highway Department standard.

C. Granular Fill - Gravel: Pit run washed stone; free of shale, clay, friable material and debris.
1. Graded in accordance with ASTM D 2487 Group Symbol GW.
2. Graded in accordance with ASTM C 136, within the following limits:
a. 2 inch sieve: 100 percent passing.
b. 1 inch sieve: 95 percent passing.
c. 3/4 inch sieve: 95 to 100 percent passing.
d. 5/8 inch sieve: 75 to 100 percent passing.
e. 3/8 inch sieve: 55 to 85 percent passing.
f. No. 4 sieve: 35 to 60 percent passing.
g. No. 16 sieve: 15 to 35 percent passing.
h. No. 40: 10 to 25 percent passing.
i. No. 200: 5 to 10 percent passing.

D. Granular Fill - Pea Gravel: Natural stone; washed, free of clay, shale, organic matter.
1. Grade in accordance with ASTM D 2487 Group Symbol GM.
2. Graded in accordance with ASTM C 136, within the following limits:
a. Minimum Size: 1/4 inch.
b. Maximum Size: 5/8 inch.

E. Sand: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
1. Grade in accordance with ASTM D 2487 Group Symbol SW.
2. Graded in accordance with ASTM C 136; within the following limits:
a. No. 4 sieve: 100 percent passing.
b. No. 14 sieve: 10 to 100 percent passing.

c. No. 50 sieve: 5 to 90 percent passing.
d. No. 100 sieve: 4 to 30 percent passing.
e. No. 200 sieve: 0 percent passing.

F. Topsoil: Topsoil excavated on-site.
1. Select.
2. Graded.
3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
4. Acidity range (pH) of 5.5 to 7.5.
5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.
6. Conforming to ASTM D2487 Group Symbol OH.

2.02 EXCAVATED MATERIALS

A. Perform all excavation of every description and of whatever substances encountered to depths indicated or specified.

B. Pile material suitable for backfilling in an orderly manner at safe distance from banks or trenches to avoid overloading and to prevent slides or cave-ins.

C. Remove and deposit unsuitable or excess materials as directed by the Engineer.

2.03 BACKFILL MATERIALS

A. Provide from materials excavated for installation of utility.
1. Select soil material free from organic matter and deleterious substances, containing no rocks or lumps over 2-inches in greatest dimension for backfill up to 12-inches above top of utility being covered.
2. Do not permit rocks larger than 2-inches in greatest dimension in top 6-inches of backfill.

2.04 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.

B. Should the quantity of suitable on-site material be insufficient to complete the work, provide suitable borrow material as approved by the Engineer at no additional expense to the Owner.

C. Provide select materials from on-site if acceptable material as approved by the Engineer is available on-site. Otherwise, provide approved select material from an off-site source.

2.05 SOURCE QUALITY CONTROL

A. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

B. If tests indicate materials do not meet specified requirements, change material and retest.

C. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 02210 for additional requirements.

C. Locate, identify, and protect utilities that remain and protect from damage.

D. Notify utility company to remove and relocate utilities.

E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

F. Protect plants, lawns, rock outcroppings, and other features to remain.

3.03 PROTECTION OF EXISTING UTILITIES AND ADJACENT STRUCTURES

A. Existing utilities:
   1. Unless shown to be removed, protect active utility lines shown on the drawings or otherwise made known to the Contractor prior to trenching. If damaged, repair or replace at no additional cost to the Owner.
   2. If active utility lines are encountered and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
   3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
   4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.
   5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.
   6. Locations within streets or highways:
      a. Comply with South Carolina Department of Transportation's (SCDOT) "Encroachment Permit" issued for the Work, and the South Carolina Department of Transportation's (SCDOT) "A Policy for Accommodating Utilities on Highway Rights-of-Way".
      b. Take all precautions and comply with all requirements as may be necessary to protect the improvements, including barricades for protection of traffic.
      c. Keep minimum of one lane open to traffic at all times where utility crosses street or highway.
   7. Protection of persons and property:
      a. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
      b. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
      c. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout and other hazards created by operations under this Section.
   8. Dewatering:
      a. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.
      b. Keep trenches and site construction area free from water.
   9. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
   10. Maintain access to adjacent areas at all times.

3.04 TRENCHING

A. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Hand trim excavations. Remove loose matter.

F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

G. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd measured by volume.

H. Remove excavated material that is unsuitable for re-use from site.

I. Stockpile excavated material to be re-used in area designated on site in accordance with Section 02210.

J. Remove excess excavated material from site.

K. Trench Excavation:
   1. Remove all materials of whatever substance encountered.

L. Where trenching occurs in existing lawns, remove turf in sections and keep damp. Replace turf upon completion of the backfilling.

M. Open cut:
   1. Excavate for utilities by open cut.
   2. If conditions at the site prevent such open cut, and if approved by the Engineer, tunneling may be used.
   3. Short sections of a trench may be tunneled if, in the opinion of the Engineer, the conductor can be installed safely and backfill can be compacted properly into such tunnel.
   4. Remove boulders and other interfering objects, and backfill voids left by such removals, at no additional cost to the Owner.
   5. Remove wet or otherwise unstable soil incapable of properly supporting the utility, as determined by the Engineer, to depth required and backfill to proper grade with stone bedding material, at no additional cost to the Owner.
   6. Excavating for appurtenances:
      a. Excavate for manholes and similar structures to a distance sufficient to leave at least 12-inches clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
      b. Overdepth excavation beyond such appurtenances that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Engineer, and at no additional cost to the Owner.

N. Trench to the minimum width necessary for proper installation of the utility, with sides as nearly vertical as possible. Accurately grade the bottom to provide uniform bearing for the utility.
   1. Dig to a true grade and to provide a smooth continuous support along the entire length of the pipe line.
   2. Excavate to a width not less than 12" greater than the outside diameter of the pipe.
   3. Trench depth shall provide a minimum of 4' of cover over the pipe as measured along the pipe centerline.
   4. Where the pipeline crosses creeks, drainage ditches or land subject to flooding, the depth of cover shall be 4' minimum.
   5. Where the pipeline crosses existing gas mains or other utilities, a minimum of 24" of separation under the existing utility shall be maintained. Additional depth of excavation as required to maintain separation shall be completed at no additional cost to the Owner.
   6. At any creek, draw, gully, embankment or other place where rough terrain exists, the trench shall be graded to avoid the use of bends or deflections greater than 2-1/2º per joint unless otherwise approved by the Engineer.
      a. Where changes in direction occur requiring greater than 2-1/2º deflection, field bending of the pipe is to be used with minimum bending radius being no less than 10 times the pipe diameter.

O. Provide sheeting and shoring necessary for protection of the Work and for the safety of personnel.
   1. Remove in units when level of backfilling has reached the elevation necessary to protect the utility work and adjacent property.
   2. Sheeting at the bottom of trenches over 10-feet deep for sewers 15-inches and larger in size, shall remain in place and be cut off no less than 2-inches above top of pipe, at no additional cost to the Owner.
   3. When, in the opinion of the Engineer, other sheeting cannot be safely removed, it shall be left in place and the Contractor will be paid for such sheeting at the prices bid.
      a. Cut such sheeting off at least 2-feet below finished surface.
      b. No lumber for sheeting or shoring exceeding that size customarily used will be paid for unless the use of larger sizes has been ordered, in writing, by the Engineer.

P. Depressions:
   1. Dig bell holes and depressions for joints after the trench has been graded. Provide uniform bearing for the pipe on prepared bottom of the trench.
   2. Except where rock is encountered, do not excavate below the depth indicated or specified.
   3. Where rock is encountered, excavate rock to a minimum overdepth of 4-inches below the trench depth indicated or specified, and to provide 6-inches clearance in any horizontal direction from all parts of the utility and appurtenances.

Q. Comply with pertinent OSHA regulations in regards to the excavation of utilities.

3.05 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.06 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Backfill trenches and excavations immediately after the pipes are laid, unless other protection is directed or indicated.

C. Select and deposit backfill materials with special reference to the future safety of the pipes.

D. Reopen trenches which have been improperly backfilled, to a depth as required for proper compaction. Refill and compact as specified, or otherwise correct to the approval of the Engineer.

E. Surplus material shall be disposed of as directed by the Engineer.

F. Original surface shall be restored to the approval of the Engineer.

G. Fill up to subgrade elevations unless otherwise indicated.

H. Lower portion of trench:
   1. Deposit approved backfill and bedding material in layers of 6-inches maximum thickness, and compact with suitable tampers to the density of the adjacent soil until there is a cover of not less than 24-inches over sewers and 12-inches over other utility lines.
   2. Take special care in backfilling and bedding operations not to damage pipe and pipe coatings.

I. Remainder of trench:
   1. Except for special materials for pavements, backfill the remainder of the trench with material free from stones larger than 6-inches or 1/2 the layered thickness, whichever is smaller, in any dimension.
   2. Deposit backfill material in layers not exceeding the thickness specified, and compact each layer to the minimum density directed by the soil engineer.

J. Undeveloped areas:
   1. Backfill in wooded, swampy or undeveloped areas shall be as specified hereinbefore, except that tamping of the backfill above a level 2-feet over the top of the pipe will not be required.
   2. Mound excavated material neatly over the ditch to provide for future settlements.

K. Employ a placement method that does not disturb or damage other work.

L. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

M. Maintain optimum moisture content of fill materials to attain required compaction density.

N. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

O. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

P. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

Q. Correct areas that are over-excavated.
   1. Thrust bearing surfaces: Fill with concrete.
   2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

R. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 100 percent of maximum dry density.
   2. At other locations: 95 percent of maximum dry density.

S. Reshape and re-compact fills subjected to vehicular traffic.

3.07 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Utility Piping:
   1. Bedding: Use general fill.
   2. Cover with general fill.
   3. Fill up to subgrade elevation.
   4. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.

C. At Pipe Culverts:
   1. Bedding: Use general fill.
   2. Cover with general fill.
   3. Fill up to subgrade elevation.
   4. Compact in maximum 8 inch lifts to 95-percent of maximum dry density.

3.08 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.09 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D3017, or ASTM D6938.

C. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.

D. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.

E. If tests indicate work does not meet specified requirements, remove work, replace and retest.

F. Frequency of Tests:
   1. Atleast one (1) field density test for every fifty (50) linear feet of trench within each lift.

3.10 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

3.11 MEASUREMENT AND PAYMENT

1. No measurement or direct payment will be made for the Work under this Section and all costs for same shall be included in the price bid for the utility line to which it pertains.

END OF SECTION

SECTION 02230

AGGREGATE BASE COURSE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stone Base Course.

B. Paving aggregates.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 1 of these Specifications.

B. Section 02210 - Grading

C. Section 02223 - Trenching

D. Section 02222 - Fill and Backfill

E. Section 02510 – Bituminous Concrete Paving

1.03 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; American Association of State Highway and Transportation Officials; 1965 (2004).

B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2010

C. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2006.

D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

E. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

G. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

H. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

I. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

J. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

K. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2010.

1.04 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.

1.05 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

1.06 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Samples: 10 lb sample of each type of aggregate; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

E. Compaction Density Test Reports.

1.07 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. Aggregate Storage, General:
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

C. Verify that survey benchmarks and intended elevations for the Work are as indicated.

PART 2 PRODUCTS

2.01 MATERIALS

A. Coarse Aggregate Type retained on No. 4 sieve: Coarse aggregate, conforming to State of South Carolina Highway Department standard.
   1. Furnish a coarse aggregate consisting of hard, durable particles of stone, reasonably free from soft, thin, elongated or laminated pieces and deleterious substances.
   2. Furnish aggregate with an abrasion loss of less than 65% as measured by the Los Angeles Abrasion Test.

B. Fine Aggregate: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
   1. Furnish a fine aggregate consisting of material produced by stone crushing operations.
   2. Liquid limit shall not exceed 25 and the plasticity index shall not exceed 6 when tested in accordance with AASH TO T-89 and T-90, respectively.
   3. Grade in accordance with ASTM D2487 Group Symbol SW.
   4. Graded in accordance with ASTM C136; within the following limits:
      a. No. 4 sieve: 100 percent passing.
      b. No. 14 sieve: 10 to 100 percent passing.
      c. No. 50 sieve: 5 to 90 percent passing.
      d. No. 100 sieve: 4 to 30 percent passing.
      e. No. 200 sieve: 0 percent passing.

C. Composite Mixture:
   1. Produce in one crushing operation or by blending the fine and coarse aggregate in proper proportions.
   2. Graded in accordance with ASTM C136; within the following limits:
      a. No. 2-0" Sieve100 Percent Passing
      b. No. 1-1/2" Sieve95-100 Percent Passing
      c. No. 1-0" Sieve70-100 Percent Passing
      d. No. 0-1/2" Sieve48-75 Percent Passing
      e. No. 4 Sieve30-50 Percent Passing
      f. No. 30 Sieve11-30 Percent Passing
      g. No. 200 Sieve0-12 Percent Passing
      h. Liquid Limit25 max.
      i. Plasticity Index6 max.

D. Provide Aggregate Type Materials that comply with Section 305 of the South Carolina Department of Transportation Standard Specifications for Highway Construction, Latest Edition.

2.02 SOURCE QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for testing and analysis of aggregate materials.

B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.

C. Where aggregate materials are specified using ASTM D2487 classification, testing of samples for compliance will be provided before delivery to site.

D. If tests indicate materials do not meet specified requirements, change material and retest.

E. Provide materials of each type from same source throughout the Work.

2.03 PRIME ASPHALT

A. Use either MC-30, RC-30, RC-70, or EA-P complying with requirements of Sections 406, 407 and 408 of the South Carolina Department of Transportation specifications.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

C. Proofroll all areas to receive crushed stone paving.
   1. Make not less than three passes over the full area, using a 35 to 50 ton rubber tired roller.

D. Remove all soft, unstable or unsuitable material that will not compact readily.
   1. Remove to full depth of unsuitable material, or to a depth of 30-inches, whichever is less.
   2. Replace with satisfactory materials.

E. Fill all holes, ruts or depressions which develop in the subgrade with approved on-site material, bringing subgrade to indicated line and grades.

F. Compact subgrade using suitable construction procedures to provide not less than 95% Standard Proctor Maximum Dry Density.

G. Seal roll the subgrade surface with a steel wheel roller, sealing the surface against excessive water infiltration.

H. Preparation of Subgrade
   1. Proofroll all areas to receive crushed stone paving.
      a. Make not less than three passes over the full area, using a 35 to 50 ton rubber tired roller.
   2. Remove all soft, unstable or unsuitable material that will not compact readily.
      a. Remove to full depth of unsuitable material, or to a depth of 30-inches, whichever is less.
      b. Replace with satisfactory materials.
   3. Fill all holes, ruts or depressions which develop in the subgrade with approved on-site material, bringing subgrade to indicated line and grades.
   4. Compact subgrade using suitable construction procedures to provide not less than 95% Standard Proctor Maximum Dry Density.
   5. Seal roll the subgrade surface with a steel wheel roller, sealing the surface against excessive water infiltration.

3.03 INSTALLATION

A. Spread aggregate over prepared substrate to a total compacted thickness of 6 inches.

B. Under Bituminous Concrete Paving:
   1. Compact to 95 percent of maximum dry density.

C. Place aggregate in maximum 4-inch layers and roller compact to specified density.

D. Place aggregates using spreader boxes or other approved spreaders uniformly on one operation.

E. Take care to avoid segregation of the fine from the coarse aggregate during handling, spreading or shaping operations.

F. Mix, while at proper moisture, with motor grader or other equipment and maintain to required section and grade until thoroughly compacted.

G. Level and contour surfaces to elevations and gradients indicated.

H. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

I. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

J. Perform using 3-wheel steel wheel roller weighing not less than 10-tons, tandem roller weighing at least 8-tons, or other rollers approved by the Engineer.

K. Start rolling at edges and proceed toward the center, continue rolling until aggregates are firmly keyed or set.

L. When initial compaction is completed, should voids remain, place fine aggregates on the surface in an amount only sufficient to fill the voids.

M. Broom, wet and roll until coarse aggregate is set, bonded and thoroughly compacted for full width and depth.

N. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

O. Apply herbicide to finished surface.

3.04 TOLERANCES

A. Thickness tolerance: Provide the compacted thicknesses shown on the Drawings within a tolerance of minus 1/2-inch.
   1. Depth measurements will be made by digging through the base at intervals no closer than 250-feet, nor greater than 500-feet apart.
   2. Where thickness is less than depth specified minus 1/2-inch, it shall be corrected as directed by the Engineer.

B. Variation From Design Elevation: Within 3/8- inch in 10-feet, parallel to the center line of the roadway nor more than 1/2-inch from a template conforming to the cross-sections illustrated on the Construction Plans.

C. Deviations: Correct by removing materials, replacing with new materials, and reworking or recompacting as required.

3.05 FIELD QUALITY CONTROL

A. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556.

B. Compaction density testing will be performed on compacted aggreagate base course in accordance with South Carolina Department of Transportation Standard Specifications for Highway Construction, Latest Edition.

C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("Standard Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

F. Allow no traffic on surface until mixture has hardened sufficiently to prevent distortion.

3.06 PLACING PRIME COAT

A. Allow base course to season sufficiently to permit uniform penetration.

B. Do not apply to wet surfaces or when the temperature is below 60ºF in the shade and falling, or below 55ºF in the shade and rising.

C. Clean surfaces of all dust, dirt, clay, etc. using mechanical brooms, etc.

D. Apply prime material, using pneumatic mounted distributors, at a rate of 0.25 to 0.30 gallon per square yard.

E. Permit no traffic on primed surfaces until bituminous material has penetrated and dried sufficiently that it does not pick up under traffic.

3.07 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

D. Allow no traffic on surface until mixture has hardened sufficiently to prevent distortion.

3.08 MEASUREMENT AND PAYMENT

A. Payment will be made at the unit price “square yard” as stated in the Bid Form for Aggregate Base Course.

END OF SECTION

SECTION 02270

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Provide protection of the environment during the construction of this project to reduce soil erosion and siltation to the lowest reasonably achievable level.

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 01 of these Specifications.
   2. Section 02100 - Site Preparation.
   3. Section 02110 - Clearing and Grubbing.
   4. Section 02271 - Riprap

1.02 GENERAL

A. Exercise every reasonable precaution, throughout the life of the project, to prevent the eroding of soil and the silting of rivers, streams, lakes, reservoirs, other water impoundments, ground or roadway surfaces, or other property. Erosion control practices to be used for this project are shown on the drawings and are to conform to South Carolina Department of Health and Environmental Control regulations.

PART 2 - PRODUCTS

2.01 CRUSHED STONE

A. Provide #57 crushed stone for project entrance and exit.

B. Provide #57 crushed stone for temporary sediment barriers around inlets and for temporary stone check dams.

2.02 GRASSING

A. Comply with Section 02930 - Grassing.

2.03 SILT FENCE

A. Posts:
   1. Posts shall be self-fastener angle steel, 5-feet in length.

B. Woven wire shall conform to the requirements of ASTM A 116, Class I zinc coating for wire. Each woven square shall measure 5.33-inches X 12-inches. The top and bottom wires shall be 10 gauge. All other wires shall be 12-1/2 gauge.

C. Filter fabric shall be Mirafi 700X synthetic fabric or approved equal.

2.04 RIP-RAP

A. Comply with Section 02271 - Riprap.

2.05 FILTER FABRIC (TEMPORARY STONE CHECK DAM)

A. Use Stabilenka Filter Fabric (T-140N), Mirafil (140N) or approved equal under all hand placed Riprap or Check Dams.

PART 3 - EXECUTION

3.01 GENERAL

A. Construct and maintain all erosion control measures until the substantial completion of the project.

3.02 TEMPORARY CONSTRUCTION ENTRANCE/EXIT

A. Construct a gravel area or pad at points where vehicles enter and leave a construction site.

B. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade and place gravel to the grade and dimensions shown on the plans.

C. Construct drainage channels to carry water to a sediment trap or other suitable outlet.

D. Use geotextile fabrics to improve stability of the foundation in locations subject to seepage or high water table.

E. Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site by periodic top dressing with two inches of stone.

F. After each rainfall, inspect any structure used to trap sediment and clean it out as necessary.

G. Immediately remove objectionable materials spilled, washed, or tracked onto public roadways.

3.03 TEMPORARY GRASSING

A. Provide a temporary cover for erosion control on disturbed areas that will remain unstabilized for a period of more than thirty (30) days in accordance with Section 02930.

B. This practice applies to cleared areas, diversions, dams, temporary sediment basins, temporary road banks, and topsoil stockpiles where vegetation is needed for less than one (1) year.

C. Provide grassing on slope 5-percent or greater within fourteen (14) days of disturbance. Comply with Section 02930.

3.04 SILT FENCE

A. Provide silt fence barrier where shown on the plans and on utility construction parallel to the disturbed trench where perpendicular sheet flow runoff occurs on disturbed areas with slopes greater than 4-percent.

B. Place at the extreme limits of the area to be disturbed as shown.

C. Construct temporary sediment barriers of filter fabric, buried at the bottom, stretched and supported by posts and install below small disturbed areas as indicated on the drawings to retain sediment by reducing the flow velocity to allow sediment deposition.

D. Provide spacing between posts 6-feet on center, minimum.

E. Remove sediment deposits prior to reaching one-third height of the fence.

F. Monitor site frequently and place additional silt fencing should evidence indicate that erosion is about to occur at locations other than those shown on plan.

3.05 EROSION CONTROL BLANKET

A. Provide on areas as shown on the plans or on all embankments with slopes equal to or steeper than 3:1.

3.06 TEMPORARY STONE CHECK DAMS

A. Utilize temporary stone check dams as indicated on the plans or directed by Engineer.

B. Provide temporary stone check dams constructed of both rip-rap and #57 stone, as illustrated on the plans. Sediment Tubes may be used in place of rock check dams.

3.07 MAINTENANCE

A. Place all erosion control devices or measures prior to any land disturbing activity within the drainage area they are located.

B. Periodically check erosion control devices and clean or otherwise remove silt build-up as necessary to maintain them in proper working order.

3.08 REMOVAL

A. Remove temporary structures after disturbed areas have stabilized.

3.09 MEASUREMENT AND PAYMENT

A. Payment shall be made per the unit price for the item as shown on the bid form.

END OF SECTION

SECTION 02271

RIPRAP

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing all labor, materials, and equipment and performing all operations in conjunction with placing protective coatings of broken stone in accordance with these specifications and in conformity with the lines, grades and thicknesses shown on the plans or established by the Engineer.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to Sections in Division 01 of these Specifications.

B. Section 02221 - Excavation.

C. Section 02222 - Fill and Backfill.

D. Section 02270 - Erosion and Sediment Control.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with State of South Carolina Department of Transportation Highways standard.

B. 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.

C. Maintain one copy of each document on site.

1.04 SUBMITTALS

A. Comply with pertinent provisions of Section 01300.

PART 2 PRODUCTS

2.01 MATERIALS

A. Riprap: Granite type; broken stone; solid and nonfriable; 6 inch minimum size, 12 inch maximum size.

B. Aggregate: Granular fill as specified in Section 02222.

C. Filter Fabric
   1. Comply with Section 02270.

PART 3 EXECUTION

3.01 RIP-RAP PLACEMENT

A. Place riprap at culvert pipe ends, embankment slopes, and as indicated.

B. Where thickness is not shown on the plans, it shall be 12-inches.

C. The slope upon which this rip-rap is to be placed shall conform with the cross section shown on the plans or as directed by the Engineer.

D. Properly compact depressions that may be filled in trimming and shaping the slope.

E. Install filter fabric, lapping sides 12-inches.

F. Begin placing in a trench at least 2-feet below the toe of the slope.

G. Firmly imbed against the slope and the adjoining piece with the sides in contact and with broken joints.

H. Fill the spaces between the larger pieces with spalls of suitable size, thoroughly ram into place.

I. The finished surface shall present an even, tight surface true to line, grade and section.

3.02 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02510

BITUMINOUS CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

B. Single course asphaltic concrete paving.

C. Double course bituminous concrete paving.

D. Surface sealer.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 1 of these Specifications.

B. Section 02210 – Grading

C. Section 02222 – Fill and Backfill

D. Section 02230 – Aggregate Base Course

E. Section 02580 – Pavement Markings

1.03 REFERENCE STANDARDS

A. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types; The Asphalt Institute; 1997.

B. AI MS-19 - A Basic Asphalt Emulsion Manual; The Asphalt Institute; Fourth Edition.

C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with State of South Carolina Department of Transportation Highways standard.

B. Mixing Plant: Conform to State of South Carolina Department of Transportation Highways standard.

C. Obtain materials from same source throughout.

D. 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.

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for paving work on public property.

1.06 SUBMITTALS

A. Comply with pertinent provisions of Section 01300.

B. Product data: Within fourteen (14) 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. Certificates, signed by the materials producer and the asphalt paving Subcontractor, stating that materials meet or exceed the specified requirements.

1.07 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

1.08 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F in the shade and falling, or below 35ºF in the shade and rising, or if surface is wet or frozen.

B. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: ASTM D946.

B. All Materials: In accordance with State of South Carolina Department of Transportation Highways standards.

C. All Materials: In accordance with State of South Carolina Department of Transportation Standard Specifications for Highway Construction, latest Edition.

D. Aggregate for Base Course: Angular crushed washed stone; free of shale, clay, friable material and debris.
   1. Graded in accordance with ASTM D2487 Group Symbol GW.
   2. Graded in accordance with ASTM C136, within the following limits:
      a. 2 inch sieve: 100 percent passing.
      b. 1 inch sieve: 95 percent passing.
      c. 3/4 inch sieve: 95 to 100 percent passing.
      d. 5/8 inch sieve: 75 to 100 percent passing.
      e. 3/8 inch sieve: 55 to 85 percent passing.
      f. No. 4 sieve: 35 to 60 percent passing.
      g. No. 16 sieve: 15 to 35 percent passing.
      h. No. 40: 10 to 25 percent passing.
      i. No. 200: 5 to 10 percent passing.

E. Aggregate for Binder Course: Angular crushed washed stone; free of shale, clay, friable material and debris.
   1. Graded in accordance with ASTM D2487 Group Symbol GW.
   2. Graded in accordance with ASTM C136, within the following limits:
      a. 2 inch sieve: 100 percent passing.
      b. 1 inch sieve: 95 percent passing.
      c. 3/4 inch sieve: 95 to 100 percent passing.
      d. 5/8 inch sieve: 75 to 100 percent passing.
      e. 3/8 inch sieve: 55 to 85 percent passing.
      f. No. 4 sieve: 35 to 60 percent passing.
      g. No. 16 sieve: 15 to 35 percent passing.
      h. No. 40: 10 to 25 percent passing.
      i. No. 200: 5 to 10 percent passing.

F. Fine Aggregate: In accordance with State of South Carolina Department of Transportation Highways standards.

G. Mineral Filler: Finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.

H. Primer: In accordance with State of South Carolina Department of Transportation Highways standards.

I. Tack Coat: Homogeneous, medium curing, liquid asphalt.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

A. Use dry material to avoid foaming. Mix uniformly.

B. Base Course: 3.0 to 6 percent of asphalt cement by weight in mixture in accordance with AI MS-2.

C. Binder Course: 4.5 to 6 percent of asphalt cement by weight in mixture in accordance with AI MS-2.

D. Submit proposed mix design of each class of mix for review prior to beginning of work.

2.03 ASPHALTIC CONCRETE MIXTURE (BINDER COURSE)

A. Materials and composition of mixture shall comply with Section 402 of the SCDOT's "Standard Specifications for Type B Mix".

B. Provide hot plant mixed asphaltic concrete paving materials.
   1. Temperature leaving the plant: 290ºF minimum, 320ºF maximum.
   2. Temperature at time of placing: 280ºF minimum.

2.04 ASPHALTIC CONCRETE MIXTURE (SURFACE COURSE)

A. Materials and composition of mixture shall comply with Section 403 of the SCDOT's "Standard Specifications for Type B Mix."

B. Provide hot plant mixed asphaltic concrete paving materials.
   1. Temperature leaving the plant: 290ºF minimum, 320ºF maximum.
   2. Temperature at time of placing: 280ºF minimum.

2.05 EQUIPMENT

A. Comply with requirements of Section 401 of SCDOT's "Standard Specifications".

2.06 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
   1. Sweep primed surfaces if needed.
   2. Adjust frames and covers if needed.

3.03 BASE COURSE

A. Place and compact base course.

B. On arrival at point of use, dump directly into mechanical spreader.

C. Immediately spread and strike off true to the line, grade and cross section indicated, to such loose depth that when work is completed, the indicated thickness or weight per square yard will be secured.

D. Correct irregularities while the mixture is still hot.

E. At locations not readily accessible to mechanical spreaders, acceptable hand spreading methods may be used.

F. Finished surfaces placed adjacent to curbs, gutters, manholes, etc., shall be approximately 1/4-inch above the edges of these structures.

G. Section 02230 - Aggregate Base Courses.

3.04 COMPACTION

A. Perform initial rolling with 3-wheel steel roller or a steel wheel 2-axle tandem roller.

B. Follow initial rolling with at least four complete coverages by a pneumatic tired roller.

C. Complete rolling with steel wheel 2-axle tandem roller.

D. Rolling shall start longitudinally at the sides and proceed gradually toward the center of the pavement, overlapping on successive trips approximately 1/2 the width of the roller.

E. Use hand or mechanical tampers in areas not accessible to powered rollers.

F. Surface mixture after compaction shall be smooth and true to the established crown and grade.

3.05 PREPARATION - PRIMER

A. Apply primer in accordance with manufacturer's instructions.

B. Apply primer on aggregate base or subbase at uniform rate of 1/3 gal/sq yd.

C. Use clean sand to blot excess primer.

3.06 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/3 gal/sq yd.

C. Apply tack coat to contact surfaces as required.

D. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.07 SEAL COAT

A. Apply seal coat to surface course and asphalt curbs in accordance with AI MS-19.

3.08 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

C. Variation from True Elevation: Within 1/8 inch, in 6-feet.

D. Free from Bird Baths.

3.09 FIELD QUALITY CONTROL

A. See Section 01400 - Quality Requirements, for general requirements for quality control.

B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

C. Flood Test
   1. Flood the entire asphaltic concrete paved area with water by use of a tank truck or hoses.
   2. If a depression is found where water ponds to a depth of more than 1/8-inch in 6-feet, fill or otherwise correct to provide proper drainage.
   3. Feather and smooth the edges of fill so that the joint between fill and original surface is invisible.

3.10 PROTECTION

A. Allow no traffic on surface until the mixture has hardened sufficiently to prevent distortion.

3.11 SCHEDULE

A. Pavement at Truck Ramp and Garbage Area: Single course of 3-1/2 inch compacted thickness, sand seal coat.

B. Pavement at Parking Areas: Two courses; binder course of 2-1/2 inch compacted thickness and wearing course of 1 inch compacted thickness, fog seal coat.

C. Pavement at Rear Bus Loading Area: Thickness and compaction of subbase to support vehicles up to 30,000 lb.

D. Pavement Front Sidewalks: Thickness and compaction of subbase to support moderate pedestrian traffic.

3.12 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02580

PAINTED PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.

B. Roadway lane markings and crosswalk markings.

1.02 RELATED REQUIREMENTS

A. Section 02510 – Bituminous Concrete Paving.

B. Section 02522 – Concrete Paving.

1.03 REFERENCE STANDARDS

A. FS TT-B-1325 - Beads (Glass Spheres); Retro-Reflective; Rev. D, 2007.

B. FS TT-P-1952 - Paint, Traffic Black, and Airfield Marking, Waterborne; Rev. E, 2007.

C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.

D. FHWA MUTCD - Manual on Uniform Traffic Control Devices for Streets and Highways; U.S. Department of Transportation, Federal Highway Administration; http://mutcd.fhwa.dot.gov; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Certificates: Submit for each batch of paint and glass beads stating compliance with specified requirements.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01600 - Product Requirements, for additional provisions.
   2. Extra Paint: 2 containers, 1 gallon size, of each type and color.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.

B. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment accompanied by batch certificate.

C. Store products in manufacturer's unopened packaging until ready for installation.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MATERIALS

A. Line and Zone Marking Paint: MPI No. 97 Latex Traffic Marking Paint; color(s) as indicated.
   1. Roadway Markings: As required by authorities having jurisdiction.
   2. Parking Lots: Yellow.
   3. Handicapped Symbols: Blue.

B. Paint For Obliterating Existing Markings: FS TT-P-1952; black for bituminous pavements, gray for portland cement pavements.

C. Reflective Glass Beads: FS TT-B-1325, Type I (low index of refraction), Gradation A (coarse, drop-on); with silicone or other suitable waterproofing coating to ensure free flow.

D. Temporary Marking Tape: Preformed, reflective, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Obliteration of existing markings using paint is acceptable in lieu of removal; apply the black paint in as many coats as necessary to completely obliterate the existing markings.

D. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
   2. Completely remove rubber deposits, existing paint markings, and other coatings adhering to the pavement, by scraping, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.
   3. Sandblasting: Use equipment of size and capacity necessary, providing not less than 150 cfm of air at pressure not less than 90 psi at each nozzle used.

E. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

F. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

G. Temporary Pavement Markings: When required or directed by Engineer, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
   1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
   2. At Contractor's option, temporary marking tape may used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Owner.

3.03 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Comply with FHWA MUTCD manual (http://mutcd.fhwa.dot.gov) for details not shown.

E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on the drawings true, sharp edges and ends.
   1. Apply paint in one coat only.
   2. Wet Film Thickness: 0.015 inch, minimum.
   3. Length Tolerance: Plus or minus 3 inches.
   4. Width Tolerance: Plus or minus 1/8 inch.

G. Roadway Traffic Lanes: Use suitable mobile mechanical equipment that provides constant agitation of paint and travels at controlled speeds.
   1. Conduct operations in such a manner that necessary traffic can move without hindrance.
   2. Place warning signs at the beginning of the wet line, and at points well in advance of the marking equipment for alerting approaching traffic from both directions. Place small flags or other similarly effective small objects near freshly applied markings at frequent intervals to reduce crossing by traffic.
   3. If paint does not dry within expected time, discontinue paint operations until cause of slow drying is determined and corrected.
   4. Skip Markings: Synchronize one or more paint "guns" to automatically begin and cut off paint flow; make length of intervals as indicated.
   5. Use hand application by pneumatic spray for application of paint in areas where a mobile paint applicator cannot be used.
   6. Distribute glass beads uniformly on the paint lines within ten seconds without any waste, applied at rate of 6 pounds per gallon of paint; if the marking equipment does not have a glass bead dispenser, use a separate piece of equipment adjusted and synchronized with the paint applicator; remove and replace markings having faulty distribution of beads.

H. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
   1. Mark the International Handicapped Symbol at indicated parking spaces.
   2. Hand application by pneumatic spray is acceptable.

I. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.04 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.

F. Replace removed markings at no additional cost to Owner.

3.05 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02635

STORM DRAINAGE PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Storm drainage piping, fittings, and accessories.

B. Connection of drainage system to municipal sewers.

C. Catch basins, Plant area drains, Paved area drainage, Site surface drainage, Detention tank, and Detention basin.

1.02 RELATED REQUIREMENTS

A. Section 02221 - Excavation

B. Section 02222 - Fill and Backfill

C. Section 02223 - Trenching for Site Utilities.

D. Section 03300 - Cast-in-Place Concrete.

1.03 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 REFERENCE STANDARDS

A. AASHTO M 36 - Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains; American Association of State Highway and Transportation Officials; 2003.

B. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2013a.

C. ASTM C12 - Standard Practice for Installing Vitrified Clay Pipe Lines; 2013.

D. ASTM C14 - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe; 2011.

E. ASTM C14M - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe [Metric]; 2011.

F. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; 2013a.

G. ASTM C76M - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe [Metric]; 2013a.

H. ASTM C425 - Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings; 2004 (Reapproved 2009).

I. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets; 2012.

J. ASTM C443M - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric); 2011.

K. ASTM C700 - Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated; 2011.

L. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2012.

M. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2011.

N. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2011.

O. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings; 2005.

P. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2008.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories,and pipe class.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Project Record Documents:
   1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

PART 2 PRODUCTS

2.01 PIPE MATERIALS

A. Concrete Pipe: Reinforced, ASTM C 76 (ASTM C 76M), Class III with Wall Type A; mesh, Tongue and Groove end joints.

B. Furnish pipe with joints designed for flexible watertight gaskets.

C. Reinforced Concrete Pipe Joint Device: ASTM C443 (ASTM C443M) rubber compression gasket joint.

2.02 CATCH BASIN, TRENCH DRAIN, CLEANOUT, AND AREA DRAIN COMPONENTS

A. Precast drop inlets, catch basins, curb inlets, etc. shall be as manufactured by Tindall Concrete Products, Inc. or equal units by others.

B. All other precast structures (i.e., headwalls, flared end sections, etc.) shall be approved by Engineer prior to installation.

C. Use precast manholes:
   1. Provide reinforced precast concrete ring and eccentric cone sections complying with ASTM C-478 and the following.
   2. Use portland cement complying with ASTM C-150, Type II.
   3. Cast ladder rungs into the units.
   4. Provide tongue and groove or o-ring rubber gasketed joints.
   5. Use vulcanized butyl rubber sealant with tongue and groove joints.
   6. Provide flat slab tops where manhole depth is less than 4'0".

D. Steps:
   1. Use aluminum or plastic steps.
   2. Provide steps having non-skid top surfaces, safety stops at each end, minimum width of 10" and not less than 5" projection from wall.
   3. Aluminum steps shall support 1000-pound load at center with no deformation, coat embedded ends with bituminous paint.
   4. Provide polypropylene plastic steps reinforced with 3/8" diameter steel rod, M.S.A. Industries, Inc. Model PS-K, or equal.

E. Frames and covers:
   1. Provide gray iron castings, complying with ASTM A 48, Class 30 iron.
   2. Machine all bearing surfaces.
   3. Provide frames weighing not less than 195 lbs. with inside opening between 21" and 24".
   4. Provide circular cover with two "pick" holes and weighing not less than 120 lbs.
   5. Covers to have the words "STORM SEWER" cast in the metal.

6. Coat frames and covers with two (2) shop coats of bitumastic paint.
7. Provide watertight covers, where indicated, conforming to above requirements and with frame tapped for four bolts, countersunk in cover.
    a. Provide rubber gasket between frame and cover.

2.03 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 02930.

B. Cover: As specified in Section 02930.

2.04 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.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 02317 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
    1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Connect to building storm drainage system, foundation drainage system, and utility/municipal sewer system.

E. Make connections through walls through sleeved openings, where provided.

F. Connect to building collection pits, through installed sleeves.

3.03 INSTALLATION - CATCH BASINS, TRENCH DRAINS AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Level top surface of base pad; sleeve concrete shaft sections to receive storm sewer pipe sections.

D. Establish elevations and pipe inverts for inlets and outlets as indicated.

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.04 FIELD QUALITY CONTROL

A. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

3.06 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02721
PIPE CULVERTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe culvert, joints and accessories.

B. Bedding and slope protection at pipe end.

1.02 RELATED REQUIREMENTS

A. Section 02221 - Excavation: Excavating of trenches.

B. Section 02222 - Fill and Backfill: Bedding and backfilling.

C. Section 02271 - Riprap.

D. Section 03300 - Cast-in-Place Concrete.

1.03 PRICE AND PAYMENT PROCEDURES

A. Pipe Culvert: By the total linear foot invert length of pipe including tapered ends and the diameter in inches. Includes hand trimming, excavating; removing soft subsoil, bedding fill, compacting; pipe, fittings and accessories assembled; repair of damaged coating.

1.04 REFERENCE STANDARDS

A. ASTM A929/A929M - Standard Specification for Steel Sheet, Metallic-Coated by the Hot-Dip Process for Corrugated Steel Pipe; 2001 (Reapproved 2007).

B. ASTM C14 - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe; 2011.

C. ASTM C14M - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe [Metric]; 2011.

D. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; 2013a.

E. ASTM C76M - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric); 2013a.

F. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets; 2012.

G. ASTM C443M - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric); 2011.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

1.06 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe, fittings and accessories.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

D. Accurately record actual locations of pipe runs, connections, and invert elevations.

E. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the work of this section.

PART 2 PRODUCTS

2.01 CONCRETE CULVERT PIPE

A. Manufacturers:
   1. Hanson Pipe & Precast or apporved equal:
   2. Substitutions: See Section 01600 - Product Requirements.

B. Concrete Pipe: Reinforced, ASTM C76 (ASTM C76M), Class I with Wall Type A; mesh reinforcement; bell and spigot end joints:

C. Reinforced Concrete Pipe Joint Device: ASTM C443 (ASTM C443M) rubber compression gasket joint.

2.02 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 02930.

B. Cover: As specified in Section 02930.

PART 3 EXECUTION

3.01 EXCAVATING

A. See 02221 for additional requirements.

B. Excavate culvert trench to 12 inches below pipe invert. Hand trim excavation for accurate placement of pipe to elevations indicated.

3.02 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe and accessories in accordance with manufacturer's instructions

C. Lift or roll pipe into position. Do not drop or drag pipe over prepared bedding.

D. Shore pipe to required position; retain in place until after compaction of adjacent fills. Ensure pipe remains in correct position and to required slope.

E. Install culvert end gratings.

3.03 PIPE ENDS

A. Place fill at pipe ends, at embankment slopes.

3.04 TOLERANCES

A. Lay pipe to alignment and slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

B. Maximum Variation From Intended Elevation of Culvert Invert: 1/2 inch.

C. Maximum Offset of Pipe From True Alignment: 1 inch.

D. Maximum Variation in Profile of Structure From Intended Position: 1 percent.

3.05 PROTECTION

A. Protect pipe and bedding from damage or displacement until backfilling operation is in progress.

3.06 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02830
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fence framework, fabric, and accessories.

B. Excavation for post bases; concrete foundation for posts.

C. Manual gates and related hardware.

D. Automatic gates and related hardware.

1.02 RELATED REQUIREMENTS

A. Section 03300 - Cast-in-Place Concrete: Concrete anchorage for posts.

accessories, hardware.

1.03 REFERENCE STANDARDS

A. ASTM A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire; 2013.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2012.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

D. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 2011a.

E. ASTM A428/A428M - Standard Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles; 2010.

F. ASTM A491 - Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric; 2011.

G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.

H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2012a

I. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2013.

J. ASTM F567 - Standard Practice for Installation of Chain-Link Fence; 2011.

K. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric; 2011.

L. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework; 2011.

M. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures; 2010.

N. ASTM F1665 - Standard Specification for Poly(Vinyl Chloride)(PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence; 2008 (Reapproved 2013).

O. CLFMI CLF 2445 - Product Manual; Chain Link Fence Manufacturers Institute; 1997.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

D. Manufacturer's Installation Instructions: Indicate installation requirements, post foundation anchor bolt templates, and post spacing.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Chain Link Fences and Gates:
   1. Master-Halco, Inc.; Chain link fence system: www.fenceonline.com.
   2. Merchants Metals; Chain link fence system: www.merchantsmetals.com.
   3. Hoover Fence Company; Chain link fence system: www.hooverfence.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS AND COMPONENTS

A. Materials and Components: Conform to CLFMI Product Manual.

B. Fabric Size: CLFMI Heavy Industrial service.

C. Intermediate Posts: Type I round.

D. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round.

E. Gates: (2) 20’-0” Swing Gates (1) at Truck Entrance and (1) at Truck Exit.

F. Gates: (2) 30’-0” Roll Gates (1) at Car Entrance and (1) at Car Exit.

G. Gates: (3) 15’-0” Roll Gates at top of Retaining Wall

2.03 MATERIALS

A. Posts, Rails, and Frames: ASTM F1083 Schedule 40 hot-dipped galvanized steel pipe, welded construction, minimum yield strength of 30 ksi.

B. Posts, Rails, and Frames: ASTM A1011/A1011M, Designation SS; hot-rolled steel strip, cold formed to pipe configuration, longitudinally welded construction, minimum yield strength of 50 ksi; zinc coating conforming to ASTM F1043 Type B on pipe exterior and interior.

C. Posts, Rails, and Frames: Formed from hot-dipped galvanized steel sheet, ASTM A653/A653M, HSLAS, Grade 50, with G90 (Z275) zinc coating.

D. Wire Fabric: ASTM A392 zinc coated steel chain link fabric.

E. Barbed Wire: Zinc-coated steel, complying with ASTM A121 Type Z Coating Class 1; 2 strands of 0.099 inch diameter wire, with 2-pointed barbs at 4 inches on center.

F. Barbed Wire: Aluminum-coated steel, complying with ASTM A121; 2 strands of 0.099 inch diameter wire, with 4-pointed barbs at 3 inches on centers.

G. Barbed Wire: PVC-coated steel, complying with ASTM F1665; 2 strands of 0.099 inch diameter wire, with 2-pointed barbs at 4 inches on center.

H. Barbed Tape: Stainless steel, 0.025 inch thick x 1 inch wide, coil diameter of 24 inch, die stamped to produce 4 barbed points at 4 inch on center; cold clench over stainless steel core.

I. Concrete: Type specified in Section 03 30 00 for unreinforced foundations.

2.04 COMPONENTS

A. Line Posts: 1.9 inch diameter.

B. Corner and Terminal Posts: 2.38 inch.

C. Gate Posts: 3.5 inch diameter.

D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.

E. Gate Frame: 1.66 inch diameter for welded fabrication.

F. Fabric: 2 inch diamond mesh interwoven wire, 6 gage thick, top selvage knuckle end closed, bottom selvage twisted tight.

G. Tension Wire.

H. Tie Wire: Aluminum alloy steel wire.

2.05 ACCESSORIES

A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

C. Extension Arms: Cast steel galvanized, to accommodate 3 strands of barbed wire, single arm, vertical.

D. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; fork latch with gravity drop and padlock hasp; keeper to hold gate in fully open position.

E. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, padlock hasp; keepers to hold gate in fully open position.

2.06 FINISHES

A. Components (Other than Fabric): Galvanized in accordance with ASTM A123/A123M, at 1.7 oz/sq ft.

B. Components (Other than Fabric): Aluminum coated at 0.40 oz/sq ft, when measured in accordance with ASTM A428/A428M.

C. Components and Fabric: Vinyl coated over coating of 1.8 oz/sq ft galvanizing.

D. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.

E. Accessories: Same finish as framing.

F. Color(s): To be selected by Engineer from manufacturer's standard range (standard aluminum coated)

PART 3 EXECUTION

3.01 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Place fabric on outside of posts and rails.

C. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

D. Line Post Footing Depth Below Finish Grade: ASTM F567.

E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.

F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.

G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

H. Install center brace rail on corner gate leaves.

I. Do not stretch fabric until concrete foundation has cured 28 days.

J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

K. Position bottom of fabric 2 inches above finished grade.

L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

N. Install bottom tension wire stretched taut between terminal posts.

O. Install support arms sloped inward and attach barbed wire; tension and secure.

P. Do not attach the hinged side of gate to building wall; provide gate posts.

Q. Install gate with fabric and barbed wire overhang to match fence. Install hardware.

R. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.02 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

C. Components shall not infringe adjacent property lines.

3.03 MEASUREMENT AND PAYMENT

A. No separate measurement or direct payment will be made for the work under this section and all costs for same shall be included in the price bid for the item to which it pertains.

END OF SECTION

SECTION 02930

GRASSING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grassing and Fertilization

B. Provide grassing for the area specified herein, or as indicated, for a complete and proper installation.

C. Water and sanitary sewer easements, including highway and street shoulders: All areas disturbed by the construction process.

1.02 RELATED REQUIREMENTS

A. Section 02222 - Fill and Backfill

B. Section 02270 - Erosion and Sediment Control

1.03 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Johnsongrass, Poison Ivy, Nut Sedge, Nimble Will, Blindweed, Bentgrass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 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. Seed: Conform to all State laws and to all requirements and regulations of the South Carolina Department of Agriculture.

1. Deliver to site each variety of seed individually packaged and tagged to show name, net weight, origin, and lot number.
2. Fertilizer: Conform to State fertilizer law.

1.05 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Comply with pertinent provisions of Section 01300.

C. Product Data: Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Complete materials list of items proposed to be provided under this Section.
2. Material Safety Data Sheets for all materials to be used.
3. Installation/Application Instructions for all relevant materials (i.e. erosion blankets, hydraulic mulches)

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

C. Comply with pertinent provisions of Section 01600 - Product Requirements

D. At time of delivery, furnish the Engineer invoices of all materials received in order that application rates may be determined.

E. Immediately remove from the site materials that do not comply with the specified requirements, and promptly replace with materials meeting the specified requirements.

PART 2 PRODUCTS

2.01 GRASS SEED

A. Provide grass seed that is:

1. Free from noxious weed seeds
2. Current year crop seed

3. Treated with appropriate fungicide at time of mixing
4. Delivered to the site in sealed containers with dealer's guaranteed analysis
    a. Water: Clean, fresh and fee of substances that could inhibit vigorous growth of grass.
    b. Stakes: Softwood lumber, chisel pointed
    c. String: inorganic fiber
    d. Lime and pH Adjustment
        1) For Dry Grassing operations provide agricultural grade, standard ground limestone conforming to the current “Rules, Regulations and Standards of the Fertilizer Board of Control” issued at Clemson University.
        2) For Hydraulic Grassing operations, provide NeutraLime® Dry by Profile Products to raise pH or Aqua-pHix® by Profile Products to lower pH at rate determined by soil analysis or at manufacturer's recommended rate.
        3) Bag tags or delivery slip for bulk loads shall indicate brand or trade name, calcium carbonate equivalent, and other pertinent data to identify the lime.
        4) Wood Fiber Mulch
            (a) Provide 100% thermally processed wood fiber or blended 70/30 wood/cellulose fiber manufactured specifically for discharging uniformly on the ground surface when dispersed by a hydro-grassing machine.
            (b) Material shall contain thermally processed wood fibers so as to contain no germination or growth inhibiting factors and to achieve phyto-sanitization.
            (c) Material shall contain basic green dye to facilitate visual metering.
        5) Flexterra HP-FGM
            (a) Provide Flexterra HP-FGM® as manufactured by Profile Products.
            (b) Material shall contain thermally refined wood fibers and crimped synthetic fibers so as to contain no germination or growth inhibiting factors.
            (c) Materials shall contain non-toxic green dye to facilitate metering.
            (d) Material shall be 100% Bio-degradable.
        6) Straw Mulch/Dry Applied Mulching Pellets
            (a) Provide straw or hay material.
            (b) Material to be reasonably dry and reasonably free from mature seed bearing stalks, roots, or bulblets or Johnson Grass, Nutgrass, Wild Onion or any other Noxious weeds detailed in part 1.04 of this Section.
            (c) Seed Aide Aero® manufactured by Profile Products at a rate of 3,000 LBS/ACRE can be used as a weed free alternative to straw mulch.
        7) Erosion Control Blanket
            (a) Provide on areas as shown on the plans
            (b) Provide Erosion Control Blanket S-2®, from Western Excelsior, or approved equal.

2.02 TESTS

A. Provide analysis of topsoil fill under provisions of Section 01400 - Quality Requirements
B. Analyze to ascertain the percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter, and pH value.
C. Submit minimum 10 oz (280 g) sample of topsoil proposed. Forward sample to approved testing laboratory in sealed containers to prevent contamination.
D. Testing is not required if recent test are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.
E. If pH is not in the range of 6.0 to 7.0, adjust accordingly with Lime.
F. Organic matter must be 2.0% or greater. If organic matter percentage is less than 2%, contractor shall apply JumpStart® and/or BioPrime® by Profile Products to modify soil organic matter. JumpStart and BioPrime to be applied at rate determined by soil analysis or at manufacturer's recommended rate

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this Section.

3.02 PREPARATION

A. Seed these areas immediately upon completion of grading or construction and clean up operations.
   a. Slopes greater than 4:1
   b. Utility right-of-ways or any other disturbed area adjacent to wetlands.
      1) Bring all areas to proper line, grade and cross section indicated on the plans.
      2) Repair erosion damage prior to commencing grassing operations.
      3) Loosen seed bed to a minimum depth of 3” and track in slope so as the direction of the track marks is perpendicular to the direction of the slope.
      4) Remove all roots, clods, stones larger than 1” in any dimension, and other debris.

3.03 FERTILIZATION

A. Apply fertilizer in accordance with manufacturer's instructions, and the Soil Analyses as detailed in part 2.03 of this Section.
B. Apply after smooth raking of topsoil and prior to roller compaction.
C. Mix thoroughly into upper 2 inches (50 mm) of topsoil.
D. If grassing using a hydro-seeder apply fertilizer in slurry with mulch, seed, and lime.
E. Spread uniformly over areas to be seeded at:
   a. Rate of 11 LBS/1000 sq. ft. when using 19-19-19.
   b. Rate of 20 LBS/1000 sq. ft. when using 10-10-10.
   c. Use approved mechanical spreaders for dry grassing application.
      1) Second Application of Fertilizer
         (a) When plants are established and showing satisfactory growth, apply Nitrogen at the rate of 1 lb. per 1000 sq. ft.
         (b) Apply using dry grassing application unless otherwise directed by Engineer.
         (c) Do not apply to stands of temporary grasses.

3.04 SEEDING

A. Mixtures of different types of seed for the various schedules shall be weighted and mixed in proper proportions in the presence of the Engineer.
B. Permanent Grassing Mix - Slopes 4:1 or Greater
   a. Schedule No. 1 - Planting Dates April 1 - September 15:
      1) Slopemaster® Spring/Summer Mix by Pennington Seed, Inc.
         (a) 25% Hulled Sahara Bermudagrass
         (b) 25% Unhulled Sahara Bermudagrass
         (c) 25% Pensacola Bahiagrass
         (d) 10% Durana White Clover
         (e) 10% Brown Top Millet
         (f) 5% Weeping Lovegrass
            (1) Rate 75 LBS/ACRE or 1.75 LBS/1000 sq. ft.
            (2) Seed to be coated with MYCO Advantage by Pennington Seed, Inc.
         (g) Permanent Grassing Mix - Slopes 4:1 or Less
            (1) Schedule No. 1 - Planting Dates April 1 - September 15:
         (h) Temporary Grassing Mix - All Disturbed Areas
            (1) Schedule No. 1 - Planting Dates April 1 - September 15:
            (2) Schedule No. 2 - Planting Dates September 15 - March 31:
         (i) Do not seed areas in excess of that which can be mulched on same day.
         (j) Do not sow during rain, when the ground is too dry, or during windy periods.
         (k) Immediately following grassing and compacting, apply mulch to a thickness of 1/8 inches (3 mm). Maintain clear of shrubs and trees.

(l) Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches (100 mm) of soil.
(m) Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches (100 mm by 100mm).

b. Schedule No. 2 - Planting dates September 16 – March 31:
1) Common Name of Seed Rate A Rate B
(a) Rye Grain 00
(b) Common Bermuda (hulled) 01.5
(c) Brown Top Millet 50
(d) Common Bermuda (unhulled) 02

3.05 SOWING METHODS

A. General:
1. Perform grassing during the periods and at the rates specified in the grassing schedules.
2. Do not conduct grassing work when ground is frozen or excessively wet.
3. Produce satisfactory stand of grass regardless of period of the year the Work is performed.
a. Grassing, slopes less than four horizontal to one vertical:
1) Grassing of slopes of 4:1 or less will be done in one of the following two ways:
2) Dry Grassing:
(a) Sow seed not more than 24 hours after application of fertilizer and lime.
(b) Use mechanical seed drills on accessible areas, rotary hand seeders, power sprayers, etc. may be used on steep slopes or areas not accessible to seed drills.
(c) Cover seed and lightly compact with culti-packer if seed drill does not.
(d) Within 24 hours following compaction of seeded areas, uniformly apply straw mulch, as defined in Section 2.01, at a rate of 4000 LBS/ACRE or 90 LBS/1000 sq. ft.
3) Hydraulic Grassing:
(a) Apply seed, fertilizer, lime, and wood fiber mulch using hydraulic equipment.
(b) Equipment to have built-in agitation system with capacity to agitate, suspend and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, lime, and water.
(c) Minimum capacity of slurry tank: 1000 gallons.
(d) Apply 100% wood or 70/30 wood/cellulose blend fiber mulch, defined in Section 2.01, at a rate of 2500 LBS/ACRE or 60 LBS/1000 sq. ft.
(e) Regulate slurry mixture so that amounts and rates of application will result in uniform application of all materials at not less than the specified amounts.
(f) Apply slurry in two directions so as to avoid “shadowing.”
(g) Use color of fiber mulch as guide, spraying the prepared seed bed until a uniform visible coat is obtained.
b. Grassing, slopes greater than four horizontal to one vertical:
1) Grassing of slopes of 4:1 or greater will be done in one of the following two ways
2) Dry Grassing:
(a) Sow seed not more than 24 hours after application of fertilizer and lime.
(b) Use mechanical seed drills on accessible areas, rotary hand seeders, power sprayers, etc. may be used on steep slopes or areas not accessible to seed drills.
(c) Cover seed and lightly compact with culti-packer if seed drill does not.
(d) Within 24 hours following compaction of seeded areas, uniformly lay double netted excelsior blanket, as defined in Section 2.01, over seeded areas.

Excelsior blanket installation and staple pattern shall conform strictly to manufacturer's instructions.

3) Hydraulic Grassing:
   (a) Apply seed, fertilizer, lime, and Flexterra HP-FGM mulch using hydraulic equipment.
   (b) Equipment to have built-in agitation system with capacity to agitate, suspend and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, lime, and water.
   (c) Minimum capacity of slurry tank: 1000 gallons.
   (d) Apply Flexterra HP FGM, as defined in Section 2.01, at a rate of 3000 LBS/ACRE or 68 LBS/1000 sq. ft.
   (e) Regulate slurry mixture so that amounts and rates of application will result in uniform application of all materials at not less than the specified amounts.
   (f) Apply slurry in two directions so as to avoid “shadowing.”
   (g) Use color of fiber mulch as guide, spraying the prepared seed bed until a uniform visible coat is obtained.

3.06 MAINTENANCE

A. Water to prevent grass and soil from drying out.
B. Roll surface to remove minor depressions or irregularities.
C. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
D. Areas not showing satisfactory evidence of germination within six weeks of the grassing or which show bare spots, shall be immediately reseeded, fertilized and/or mulched.
E. Protect seeded areas with warning signs during maintenance period.
F. Maintain all seeded areas in satisfactory condition until final acceptance of Work.
G. Repair any eroded areas.
H. Mow as necessary to maintain healthy growth rate until final acceptance of the Work.

3.07 ACCEPTANCE

A. Permanently seeded areas will be accepted when the stand of grass reaches 70% coverage.
B. No acceptance will be made of temporary seeded areas.

3.08 MEASURE AND PAYMENT

A. Measurement and payment will be made for the work under this Section at the Unit Price per "Acre" as stated in the Bid Form.

END OF SECTION

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

1.02 RELATED REQUIREMENTS

A. Section 03100 - Concrete Forms and Accessories.

B. Section 03300 - Cast-in-Place Concrete.

1.03 MEASUREMENT AND PAYMENT PROCEDURES

A. No separate measurement or direct payment will be made for this work and all costs for same shall be included in the lump sum price bid for the project.

1.04 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.

B. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2012.

C. CRSI (DA4) - Manual of Standard Practice; Concrete Reinforcing Steel Institute; 2009.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Steel Welded Wire Reinforcement: ASTM A884/A884M, deformed, Class A epoxy coated type.
   1. Mesh Size: 6 x 12 (150 x 300).
   2. Wire Gage: 10x10 (254x254).

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Maintain concrete cover around reinforcing as follows:
   1. Slabs on Fill: 3 inch (76.2 mm).

D. Conform to applicable code for concrete cover over reinforcement.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floors and slabs on grade.

B. Concrete curb and gutter.

C. Concrete reinforcement.

D. Joint devices associated with concrete work.

E. Miscellaneous concrete elements, including equipment pads, light pole bases, flagpole bases, thrust blocks, manholes, and sidewalks.

F. Concrete curing.

G. Provide cast-in-place concrete, including formwork and reinforcement, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.02 RELATED REQUIREMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, and Sections in Division 1 of these Specifications.

B. Section 02222 - Fill and Backfill.

C. Section 02635 - Storm Drainage Piping.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International; 2010.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).

C. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; American Concrete Institute International; 1998 (Reapproved 2004).

D. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010.

E. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).

F. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

G. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.

H. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.

I. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).

J. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2011.

K. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International; 2004.

L. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

M. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.

N. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2009.

O. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2007b.

P. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2012.

Q. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

R. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2012a.

S. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2013.

T. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2010a.

U. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.

V. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.

W. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2010b.

X. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

Y. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

Z. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete; 2009.

AA. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

AB. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2012.

AC. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2011.

AD. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2010.

AE. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2010.

AF. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 1999 (Reapproved 2008).

AG. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2013.

AH. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2012.

AI. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 2011.

AJ. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).

AK. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy Coated Reinforcing Steel Bars; 2001 (Reapproved 2007).

AL. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996 (Reapproved 2008).

AM. ASTM E 1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers [Metric]; 1996 (Reapproved 2008).

AN. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

AO. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; 1992.

AP. COE CRD-C 513 - COE Specifications for Rubber Waterstops; Corps of Engineers; 1974.

AQ. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; Corps of Engineers; 1974.

AR. NSF 61 - Drinking Water System Components - Health Effects; 2012.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Samples: Submit samples of underslab vapor retarder to be used.

D. Samples: Submit 2 inch (50 mm) long samples of waterstops and construction joint devices.

E. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

G. Within fourteen (14) calendar days after receiving the Owner's Notice to Proceed, submit proposed mix designs for approval.
   1. Proportions shall be determined by means of laboratory tests of concrete made with the cement and aggregate proposed for use.
   2. Provide report in detail from an approved testing laboratory showing 7-day and 28-day strengths obtained using materials proposed.
   3. Required average strength above specified strength:
      a. Determinations of required average strength above specified strength (f'c) shall be in accordance with ACI 318 and ACI 301.
      b. Establish the required average strength of the design mix using the materials proposed to be employed. Standard deviations shall be determined by thirty tests. Average strength used for selecting proportions shall exceed specified strength (f'c) by at least:
         1) 400 psi – Standard deviation is less than 300
         2) 550 psi – Standard deviation is 300 to 400
         3) 700 psi – Standard deviation is 400 to 500
         4) 900 psi – Standard deviation is 500 to 600
         5) 1200 psi – Standard deviation is above 600 or unknown
      c. When the ready-mix producer does not have a record of past performance, the combination of materials and the proportions selected shall be selected from trial mixes having proportions and consistencies suitable for the work using at least three (3) different water/cement ratios which will produce a range of strengths encompassing those required. Average strength required shall be 1200 psi above specified strength.
   4. Cost of this work shall be borne by the Contractor.

H. Manufacturer's data: Submit manufacturer's specification with application instructions for proprietary materials and items, including curing compound, form release agents, admixtures, patching compounds, and others as required by the Engineer.

I. Shop drawings: Submit the following shop drawings to the Engineer for approval before work is started:
   1. Reinforcing steel drawings: Prepare in accordance with ACI 315. Indicate bending diagrams, assembly diagrams, splicing and laps of bars, dimensions and details of bar reinforcing and accessories.
   2. Cementitious coating.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.

B. Acquire cement from same source and aggregate from same source for entire project.

C. Follow recommendations of ACI 305R when concreting during hot weather.

D. Follow recommendations of ACI 306R when concreting during cold weather.

E. 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.

F. Testing agency: A testing laboratory will be retained by the Owner to perform material evaluation tests required by these specifications.

G. Qualifications of contractors performing concrete work: Minimum of two (2) years experience on comparable concrete projects.

H. Plant qualification: Plant equipment and facilities shall meet all requirements of the Check List for Certification of Ready Mixed Concrete Production Facilities of the National Ready Mixed Concrete Association and ASTM C94.

1.06 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

B. Store reinforcement in a manner that will avoid excessive rusting or coating by grease, oil, dirt and other objectionable materials.

C. Keep reinforcement in separate piles or racks so as to avoid loss of identification after bundles are broken.

PART 2 PRODUCTS

2.01 FORMWORK

A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
   2. Form Facing for Exposed Finish Concrete: Steel.
   3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.
   5. Use form materials conforming to ACI 347.
   6. Form ties: Use form ties which do not leave an open hole through the concrete and which permit neat and solid patching at every hole.
      a. Use ties with cones that allow a 1-inch break back and facilitate patching.
      b. On structures containing water or other liquid or below grade structures, use embedded rod ties with integral waterstops in addition to cones.
      c. Wire ties and wood spreaders will not be permitted.

2.02 REINFORCEMENT

A. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

B. Comply with the following as minimums:
   1. Bars: ASTM A615, Grade 60, unless otherwise shown on the Drawings, using deformed bars for Number 3 and larger.
      a. Welded wire fabric: ASTM A185.
         1) Use sheet (mat) welded wire fabric only.
         2) Welded wire fabric supplied in rolls will not be accepted.
      b. Bending: ACI 315 and ACI 318.

2. Fabricate reinforcement to the required shapes and dimensions, within fabrication tolerances stated in the CRSI "Manual of Standard Practices".
3. Do not use reinforcement having any of the following defects:
    a. Bar lengths, depths, or bends exceeding the specified fabricating tolerances.
    b. Bends or kinks not indicated on the Drawings or required for this Work.
    c. Bars with excessive rust, scale, dirt, oil or other defects which will reduce the bond or the effective cross section of the bar.
4. Furnish all support bars, tie bars, chairs, bolsters, etc. required for properly supporting and spacing bars in the forms.
    a. For slabs on grade, use supports with stand plates or horizontal runners where wetted base materials will not support chair legs. Other supports must be approved by the Engineer.
    b. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are hot-dip galvanized, plastic protected or stainless steel.
5. Tie wire: FS QQ-W-461, annealed steel, black, 16 gauge minimum.
6. Welding electrodes: AWS A5.1, low hydrogen, E70 series.
7. Splice devices: Shall be sized to develop one hundred twenty-five (125%) percent of yield strength of bar.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C 150, Type I - Normal, Type 1-P or Type II, Portland type low alkali.
    1. Acquire all cement for entire project from same source.
    2. Where concrete will be exposed to sewage, use Type II or I-P cement.

B. Fine and Coarse Aggregates: ASTM C 33, Coarse, use No. 57 aggregates.
    1. Acquire all aggregates for entire project from same source.

C. Lightweight Aggregate: ASTM C 330.

D. Fly Ash: ASTM C618, Class C or F.

E. Calcined Pozzolan: ASTM C618, Class N.

F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

G. Water: Clean and not detrimental to concrete.

2.04 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Proportioning Structural Lightweight Concrete: Comply with ACI 211.2 recommendations.

C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
    1. For trial mixtures method, employ independent testing agency acceptable to Engineer for preparing and reporting proposed mix designs.

D. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

E. Provide concrete with the compressive strengths shown on the Drawings. When such strengths are not shown on the Drawings, provide the following 28-day strengths as minimum:

1.	All structural concrete except as indicated in Nos. 2 and 3 below	4,000 psi or as noted otherwise on the plans
2.	All sidewalks, curbs and gutters, and unreinforced foundations	3,500 psi
3.	Thrust blocking, backfill or encasement for piping, and concrete fill	2,500 psi
4.	Prestressed or precast concrete:	5,000 psi

F. Maximum water cement ratios:

1.	4,000 psi concrete	0.5
2.	3,500 psi concrete	0.53
3.	2,500 psi concrete	0.67

G. Entrained air:
   1. 3,500 and 4,000 psi concrete — 5-percent (Maximum 1-percent Difference)
   2. 2,500 psi concrete — Not Required

H. Slump:
   1. 3,500 and 4,000 psi concrete — 4-inch (Maximum 1-inch Difference)
   2. 2,500 psi concrete — 5-inch (Maximum 1-inch Difference)

2.05 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
   1. Colored Concrete: Add pigments in strict accordance with manufacturer's instructions to achieve consistent color from batch to batch.

B. Transit Mixers: Comply with ASTM C94/C94M.

2.06 PRODUCTION OF CONCRETE

A. General: Concrete shall be ready mixed and shall be batched, mixed and transported in accordance with ASTM C94 except as otherwise indicated.

B. Monitor time and mix proportions by plant delivery slips.

C. Air entraining admixtures: Add air entraining admixture into the mixture as a solution and measure by means of an approved mechanical dispensing device.

D. Water reducing and retarding admixture: Add water reducing and retarding admixture and measure as recommended by the manufacturer.

E. Addition of water to the mix upon arrival at the job site shall not exceed that necessary to compensate for a 1-inch loss in slump, nor shall the design maximum water-cement ratio be exceeded. Water shall not be added to the batch at any later time.

F. Weather conditions: Control temperature of mix as required by ACI 306 "Cold Weather Concreting" and by ACI 305 "Hot Weather Concreting".

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

A. Verify that forms are clean and free of rust before applying release agent.

B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

D. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

F. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended

products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

1. Granular Fill Over Vapor Retarder: Cover vapor retarder with compactible granular fill as shown on the drawings. Do not use sand.
2. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as shown on the drawings. Do not use sand.

3.03 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Water, mud, organic, and other detrimental material shall be removed from excavations before concrete is deposited.

C. Notify the Engineer prior to placing concrete and place no concrete until the formwork, reinforcing and embedded items have been observed by the Engineer.

3.04 PLACING CONCRETE

A. Preparation:
   1. Remove foreign matter accumulated in the forms.
   2. Rigidly close openings left in the formwork.
   3. Wet wood forms sufficiently to tighten up cracks. Wet other material sufficiently to maintain workability of the concrete.
   4. Use only clean tools.
   5. Provide and maintain sufficient tools and equipment on hand to facilitate uninterrupted placement of the concrete.
   6. Before commencing concrete, inspect and complete installation of formwork, reinforcing steel and all items to be embedded or cast-in.

B. Place concrete in accordance with ACI 304R.

C. Place concrete for floor slabs in accordance with ACI 302.1R.

D. Notify Engineer not less than twenty-four (24) hours prior to commencement of placement operations.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than 7 days.
   2. High early strength concrete: Not less than 4 days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
   1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   3. Final Curing: Begin after initial curing but before surface is dry.

a. Moisture-Retaining Cover: Seal in place with waterproof tape or adhesive.
b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

E. Protect the surface finish of newly placed concrete from damage by rainwater or construction traffic.

F. Do not apply design loads to structures until the concrete has obtained the specified strength.
1. Do not backfill against walls until they have reached the specified strength and all supporting or bracing walls, slabs, etc. have also reached the specified strength, unless otherwise permitted by the Engineer.
2. Protect structures from construction overloads.

G. Beginning immediately after placement, protect concrete from premature drying, excessively hot and cold temperatures and mechanical injury.

H. Continuously cure concrete for a period of not less than seven (7) days after placement.
1. When seven-day cylinder breaks indicate, in the opinion of the Engineer, the possibility of low strength concrete, provide additional curing as per the request of the Engineer.
2. When temperatures during the curing period fall below 40ºF, provide additional curing time as directed by the Engineer.

I. Unless otherwise directed by the Engineer, cure concrete not in contact with forms in accordance with one of the following procedures:
1. Ponding or sprinkling: Keep entire concrete surface wet by continuously sprinkling or by allowing water to pond, covering all surfaces.
2. Wet burlap: Thoroughly wet and cover all concrete surfaces with wet burlap mats as soon as the concrete has set sufficiently to avoid marring the surface.
a. Keep the burlap continuously wet during the curing period.
3. Curing blankets: Thoroughly wet concrete surfaces to be cured and cover with curing blankets as soon as the concrete has set sufficiently to avoid marring the surface.
a. Weight the blankets down to maintain close contact with the concrete surface.
b. Use sheets of waterproof kraft paper with the joints between sheets taped continuously; or
c. Use sheets of 4 mil or thicker polyethylene with the joints between sheets continuously taped.
4. Wet sand: Apply a layer of sand over the entire surface and keep it continuously wet.
5. Curing compound: Apply curing compound immediately after completion of the finish on uniformed surfaces and within two hours after removal of forms on formed surfaces.
a. Spray the entire surface with two coats of liquid curing compound, applying the second coat in the direction of 90º to the first coat.
b. Apply compound in accordance with the manufacturer's instructions to cover the surface with a uniform film which will seal thoroughly.

J. Hot weather: When necessary, provide wind breaks, shading, fog spraying, sprinkling, ponding or wet covering with a light colored material applying as quickly as concrete hardening and finishing operations will allow.

K. Cold weather: Cold weather concrete placement of concrete shall be in accordance with requirements set forth by ACI 603.

3.06 SURFACE REPAIR

A. Patching mortar:
1. Make a patching mortar consisting of 1 part portland cement to 2-1/2 parts sand by damp loose volume.
2. Mix the mortar using one part acrylic bonding admixture to two parts water.

B. Tie holes: Clean and dampen all tie holes and fill solidly with patching mortar.

C. Surface defects:
1. Remove all defective concrete down to sound solid concrete.

2. Chip edges perpendicular to the concrete surface or slightly undercut, allowing no feather edges.
3. Dampen surfaces to be patched.
4. Patch defects by filling solidly with repair mortar.

D. Allow the Engineer to observe the work before placing the patching mortar.

E. Repair defective areas greater than 1 sq. ft. or deeper than 1-1/2-inches as directed by the Engineer using materials approved by the Engineer at no additional expense to the Owner.

3.07 JOINTS

A. Construction joints:
1. Unless otherwise approved by the Engineer, provide construction joints as shown on the drawings.
2. If additional construction joints are found to be required, secure the Engineer's approval of joint design and location prior to start of concrete placement.
3. Continue all reinforcing across construction joints and provide 1-1/2-inches deep keyways unless indicated otherwise on the drawings.
   a. Form keyways in place.
4. Provide waterstops in all construction joints of liquid containing structures, structures below grade or other structures as shown on the drawings.

B. Expansion joints:
1. Provide expansion joints of size, type and locations as shown on the drawings.
2. Do not permit reinforcement or other embedded metal items that are being bonded with concrete (except smooth dowels bonded on only one side of the joints, where indicated on the drawings) to extend continuously through any expansion joint.
3. Provide waterstops where required.

C. Control or contraction joints:
1. Locate and construct control and contraction joints in accordance with the Drawings.
2. Where no specific joint pattern is indicated in slabs on grade or concrete pavements, submit a proposed joint layout to the Engineer for approval.
3. Where no specific joint details are shown on the drawings, joints may be tooled, preformed or saw-cut.
4. Saw-cut joints as soon as the concrete has hardened sufficiently to prevent aggregates from being dislodged by the saw.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01400.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

H. Concrete cylinder tests:
1. During construction, prepare test cylinders for compressive strength testing, using 6-inch diameter by 12-inches long single use molds, complying with ASTM C31.

a. Make a set of three test cylinders from each pour of 50 cubic yards or less, plus one additional set of cylinders for each additional 50 cubic yards or fraction thereof.
b. Identify each and tag cylinder as to date of pour and location of concrete which it represents.
c. Deliver cylinders to testing lab selected by the Owner.
d. Cost for preparation and delivery of cylinders shall be borne by the Contractor. Cost for testing cylinders will be borne by the Owner.

2. Should strengths shown by test cylinders fail to meet specified strengths for the concrete represented, then:
a. Engineer shall have the right to require changes in the mix proportions as he deems necessary on the remainder of the work.
b. Additional curing of those portions of the structure represented by the failed test cylinders shall be accomplished as directed by the Engineer.
c. Upon failure of the additional curing to bring the concrete up to specified strength requirements, strengthening or replacement of those portions of the structure shall be as directed by the Engineer.
d. The Engineer may require additional testing of concrete in question by either non-destructive methods such as the Swiss Hammer, Windsor Probe or Ultrasonics or by coring and testing the concrete in question in accordance with ASTM C42. Such testing shall be performed at no additional cost to the Owner.

I. Other field concrete tests:
1. Slump tests: A testing laboratory representative will make slump tests of concrete as it is discharged from the mixer.
a. Slump test may be made on any concrete batch at the discretion of the Engineer.
b. Failure to meet specified slump requirements (prior to addition of any superplasticizers) will be cause for rejection of the concrete.
2. Temperature: The concrete temperature may be checked at the discretion of the Engineer.
3. Entrained air: Air content of the concrete will be checked by a representative of the testing laboratory at the discretion of the Engineer.

J. Coordination of laboratory services: The Contractor shall be responsible for coordination of laboratory services.
1. Maintain a log recording quantities of each type of concrete placed, date and location of pour.
2. Inform the testing laboratory of locations and dates of concrete placement and other information as required to be identified in the laboratory's test reports.

K. Tests required because of extensive honeycombing, poor consolidation of the concrete or any suspected deficiency in the concrete will be paid for by the Contractor.

L. Dimensional tolerances:
1. Dimensional tolerances for allowable variations from dimensions or locations of concrete work, including the locations of embedded items shall be as given in ACI 301.
2. Where anchor bolts or other embedded items are required for equipment installation, comply with the manufacturer's tolerances if more stringent than those stated in ACI 301.

M. Watertight concrete:
1. All liquid containing structures, basements or pits below grade shall be watertight.
2. Any visible leakage or seepage shall be repaired as instructed by the Engineer at no expense to the Owner.
3. Where physical evidence of honeycombing, cold joints or other deficiencies which may impair the watertightness of a structure exists, the Engineer may at his discretion call for leak testing of the structure.
a. Fill the structure with water and allow to stand for not less than forty-eight (48) hours.

b. Make repairs on the structure until all visible leaks are sealed and the leakage rate of the water in the structure is less than 0.1-percent of the volume held in the structure per day.
c. The cost of testing and repairs shall be performed at no expense to the Owner.

N. Concrete which fails to meet strength requirements, dimensional tolerances, watertightness criteria, or is otherwise deficient due to insufficient curing, improper consolidation or physical damage shall be replaced or repaired as instructed by the Engineer at no expense to the Owner.

3.09 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Owner and within twenty-four (24) hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Engineer. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

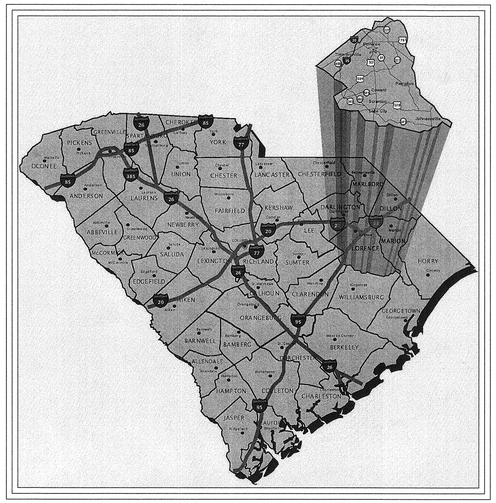
D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

3.10 MEASUREMENT AND PAYMENT

A. No measurement or direct payment will be made for the work under this Section and all costs for same shall be included in the price bid for the item in which the concrete work is an integral part.

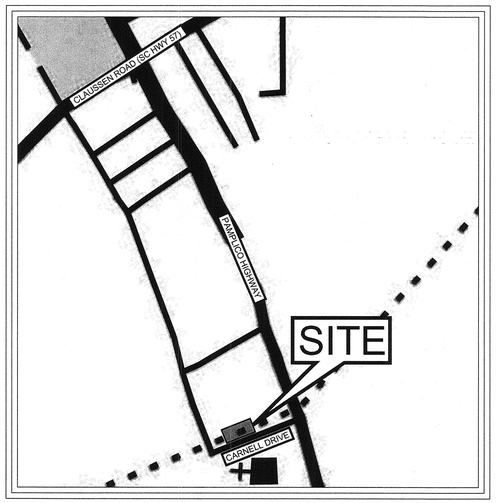
END OF SECTION

SITE IMPROVEMENTS
FOR THE
GREENWOOD CONVENIENCE CENTER
IN
FLORENCE COUNTY, SOUTH CAROLINA
FOR
FLORENCE COUNTY



VICINITY MAP

NOT TO SCALE



LOCATION MAP

Scale 1" = 2,000'

N

SHEET INDEX

SHEET	SHEET NO
EXISTING CONDITIONS AND GENERAL NOTES	C1
DEMOLITION, CLEARING AND GRUBBING PLAN	C2
SITE PLAN	C3
GRADING AND STORM DRAINAGE PLAN	C4
EROSION AND SEDIMENT CONTROL PLAN	C5
STORM DRAINAGE PROFILES	C6
SITE DETAILS (SHEET 1 OF 2)	C7
SITE DETAILS (SHEET 2 OF 2)	C8
EROSION AND SEDIMENT CONTROL DETAILS (SHEET 1 OF 2)	C9
EROSION AND SEDIMENT CONTROL DETAILS (SHEET 2 OF 2)	C10

DEVELOPER INFORMATION

OWNER:	FLORENCE COUNTY
CONTACT:	MR. ARTHUR CARLIE GREGG, JR., PUBLIC WORKS DIRECTOR
ADDRESS:	6746 FRIENDFIELD ROAD, POST OFFICE BOX 38
CITY, STATE:	EFFINGHAM, SOUTH CAROLINA 29541
TELEPHONE:	(843) 665-3022
FAX:	(843) 676-8625
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FLORENCE COUNTY COUNCIL MEMBERS

MR. ROGER M. POSTON, CHAIRMAN
MR. JAMES SCHOFIELD, VICE CHAIRMAN
MR. MITCHELL KIRBY, SECRETARY-CHAPLAIN
MR. JASON SPRINGS
MR. ALPHONSO BRADLEY
MR. KENT C. CAUDLE
MR. H. STEVEN DeBERRY IV
REV. WAYMON MUMFORD
MR. WILLARD DORRIETY, JR.

NPDES PERMIT INFORMATION

NPDES DISTURBED AREA = 0.99 ACRES

APPROXIMATE LOCATION OF SITE IS:
LONGITUDE 79° 43'22.90" W
LATITUDE 34° 7'53.51" N

RAILROAD INVOLVEMENT? YES / NO

GAS TRANSMISSION INVOLVEMENT? YES / NO

South Carolina 811 Call 811 Before you Dig

REVISION	DATE

NORTH CAROLINA AUTHORIZATION
U.S. CERTIFICATE OF AUTHORIZATION
Alliance Consulting Engineers, Inc.
No. C02854
DATE:

SOUTH CAROLINA REGISTERED ENGINEER
No. 28279
KYLE M. [illegible]
SIGNATURE:

ALLIANCE CONSULTING ENGINEERS

ALLIANCE CONSULTING ENGINEERS, INC.
POST OFFICE BOX 8147
COLUMBIA, SOUTH CAROLINA 29202-8147
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PROJECT
SITE IMPROVEMENTS
FOR THE
GREENWOOD CONVENIENCE
CENTER
IN
FLORENCE COUNTY.
SOUTH CAROLINA

FLORENCE COUNTY — SOUTH CAROLINA

JANUARY 2015

Project No. 15103-0021

DWG NO. 01.896-D16

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LEGEND

109	EXISTING CONTOUR MINOR	106.59	EXISTING SPOT ELEVATIONS
110	EXISTING CONTOUR MAJOR		EXISTING PROPERTY PINS
PL	EXISTING PROPERTY LINE		EXISTING BENCHMARK
	EXISTING ADJACENT PROPERTY LINE		EXISTING POWER POLE
SD	EXISTING STORM DRAIN		EXISTING CONCRETE
	EXISTING EDGE OF PAVEMENT		EXISTING PAVEMENT
R/W	EXISTING RIGHT-OF-WAY		
OHE	EXISTING OVERHEAD ELECTRIC LINE		EXISTING DIRT ROAD
UGP	EXISTING UNDERGROUND POWER LINE		EXISTING GRAVEL
X	EXISTING FENCE LINE		
	EXISTING TREELINE		

NOTE: UTILITY LOCATIONS ARE APPROXIMATE AND MUST BE FIELD LOCATED PRIOR TO ANY LAND DISTURBANCE BY THE CONTRACTOR.

NOTES:
CAD FILES WILL BE PROVIDED TO CONTRACTOR FOR USE WITH SITE STAKING.

REFERENCES:
1. REFERENCE IS MADE TO AN ALTA/ACSM LAND TITLE SURVEY WITH TOPOGRAPHIC AND EXISTING CONDITIONS BY JONATHAN W. NESBITT OF NESBITT SURVEYING CO., INC. FOR FLORENCE COUNTY DATED JANUARY 30, 2015.

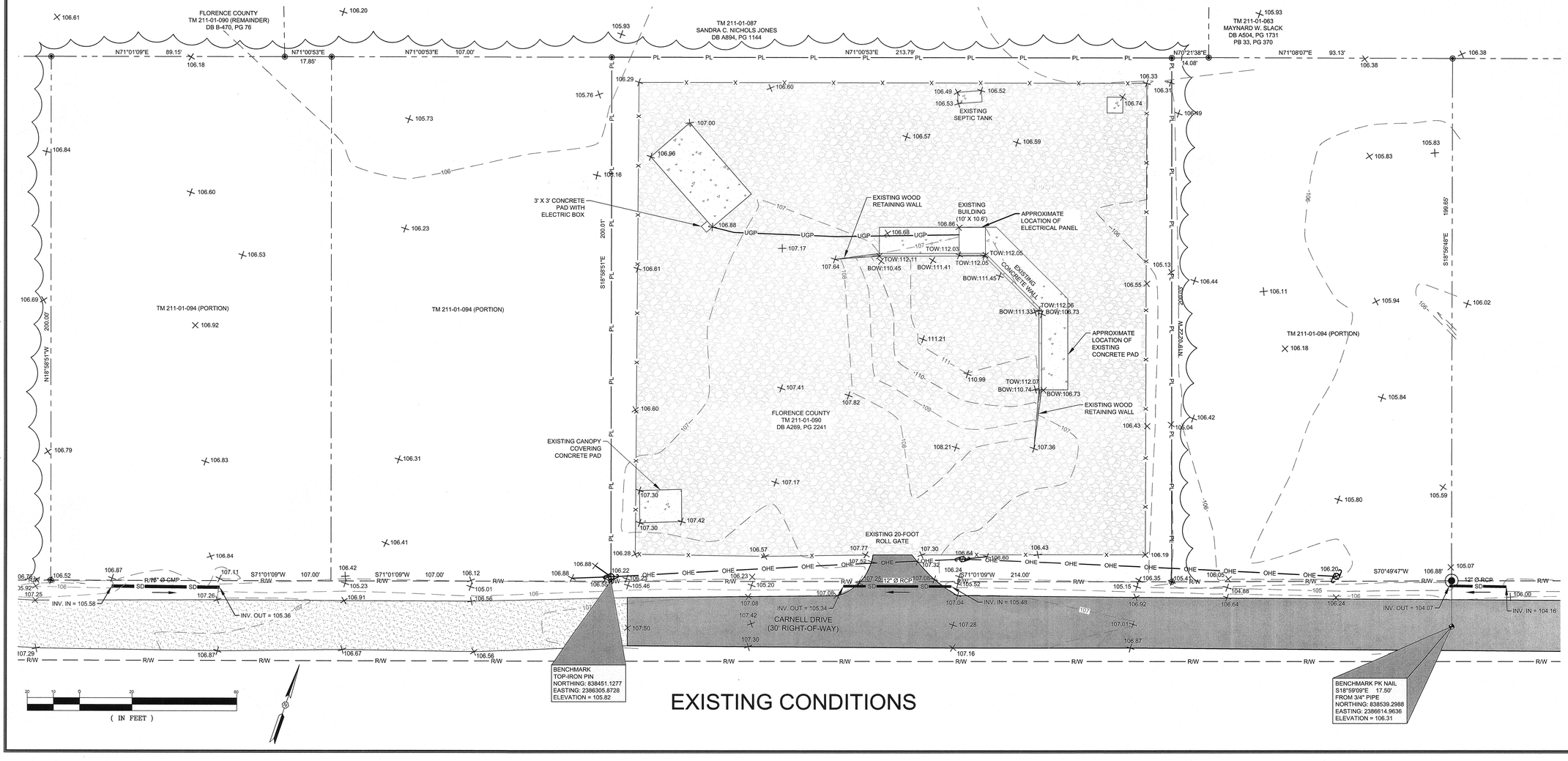
DEVELOPER INFORMATION

OWNER:	FLORENCE COUNTY
CONTACT:	MR. ARTHUR CARLIE GREGG, JR., PUBLIC WORKS DIRECTOR
ADDRESS:	6746 FRIENDFIELD ROAD, POST OFFICE BOX 38
CITY, STATE:	EFFINGHAM, SOUTH CAROLINA 29541
TELEPHONE:	(843) 665-3022
FAX:	(843) 676-8625
EMAIL:	CGREGG@FLORENCECO.ORG

STANDARD NOTES

PERMITS / LICENSES
1. PRIOR TO THE COMMENCEMENT OF ANY WORK WITHIN THE PROJECT SITE, THE GENERAL CONTRACTOR AND ALL SUB-CONTRACTORS SHALL POSSESS ALL APPLICABLE PERMITTING AND THE OWNER AND ENGINEER WILL BE GIVEN AT LEAST TWENTY-FOUR (24) HOURS NOTICE BEFORE BEGINNING WORK.

PROCEDURES / RESPONSIBILITIES
1. SLOPES, WHICH EXCEED EIGHT (8) VERTICAL FEET SHOULD BE STABILIZED WITH SYNTHETIC OR VEGETATIVE MATS, IN ADDITION TO HYDROGENATING. IT MAY BE NECESSARY TO INSTALL TEMPORARY SLOPE DRAINS DURING CONSTRUCTION. TEMPORARY BERMS MAY BE NEEDED UNTIL THE SLOPE IS BROUGHT TO GRADE.
2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN FOURTEEN (14) DAYS AFTER WORK HAS CEASED, EXCEPT AS STATED BELOW.
   - WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.
   - WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH-DISTURBING ACTIVITIES WILL BE RESUMED WITHIN 14 DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THE PORTION OF THE SITE.
3. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED ONCE EVERY CALENDAR WEEK. IF PERIODIC INSPECTION OR OTHER INFORMATION INDICATES THAT A BMP HAS BEEN INAPPROPRIATELY OR INCORRECTLY INSTALLED, THE PERMITTEE MUST ADDRESS THE NECESSARY REPLACEMENT OR MODIFICATION REQUIRED TO CORRECT THE BMP WITHIN 48 HOURS OF IDENTIFICATION.
4. PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED, AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER, AND TEMPORARY SEEDING AT THE END OF EACH DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE SEDIMENT BEFORE BEING PUMPED BACK INTO ANY WATERS OF THE STATE.
5. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
6. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO PAVED ROADWAY(S) FROM CONSTRUCTION AREAS AND THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT, AS MAY BE REQUIRED.
7. TEMPORARY DIVERSION BERMS AND/OR DITCHES SHALL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT-LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.
8. LITTER, CONSTRUCTION DEBRIS, OILS, FUELS, AND BUILDING PRODUCTS WITH SIGNIFICANT POTENTIAL FOR IMPACT (SUCH AS STOCKPILES OF FRESHLY TREATED LUMBER) AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE IN STORM WATER DISCHARGES.
9. INITIATE STABILIZATION MEASURES ON ANY EXPOSED STEEP SLOPE (3H:1V OR GREATER) WHERE LAND-DISTURBING ACTIVITIES HAVE BEEN PERMANENTLY OR TEMPORARILY CEASED, AND WILL NOT RESUME FOR A PERIOD OF 7 CALENDAR DAYS.
10. MINIMIZE SOIL COMPACTION AND, UNLESS INFEASIBLE, PRESERVE TOPSOIL AND REPLACE WITHIN ALL GRASSED AND LANDSCAPED AREAS TO A MINIMUM DEPTH OF 6". IF ADDITIONAL TOPSOIL IS REQUIRED TO MEET THE SPECIFICATIONS, THE CONTRACTOR MUST PROVIDE FROM AN OFF-SITE SOURCE.
11. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM EQUIPMENT AND VEHICLE WASHING, WHEEL WASH WATER, AND OTHER WASH WATERS. WASH WATERS MUST BE TREATED IN A SEDIMENT BASIN OR ALTERNATIVE CONTROL TO PROVIDE EQUIVALENT OR BETTER TREATMENT PRIOR TO DISCHARGE.
12. MINIMIZE THE DISCHARGE OF POLLUTANTS FROM DEWATERING OF TRENCHES AND EXCAVATED AREAS. THESE DISCHARGES ARE TO BE ROUTED THROUGH APPROPRIATE BMPS (SEDIMENT BASIN, FILTER BAG, ETC.)
13. THE FOLLOWING DISCHARGES FROM SITES ARE PROHIBITED:
   - WASTEWATER FROM WASHOUT OF CONCRETE, UNLESS MANAGED BY AN APPROPRIATE CONTROL;
   - WASTEWATER FROM WASHOUT AND CLEANOUT OF STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS;
   - FUELS, OILS, OR OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE; AND
   - SOAPS OR SOLVENTS USED IN VEHICLE AND EQUIPMENT WASHING.
14. AFTER CONSTRUCTION ACTIVITIES BEGIN, INSPECTIONS MUST BE CONDUCTED AT A MINIMUM OF AT LEAST ONCE EVERY CALENDAR WEEK AND MUST BE CONDUCTED UNTIL FINAL STABILIZATION IS REACHED ON ALL AREAS OF THE THE CONSTRUCTION SITE.
15. IF EXISTING BMPS NEED TO BE MODIFIED OR IF ADDITIONAL BMPS ARE NECESSARY TO COMPLY WITH THE REQUIREMENTS OF THIS PERMIT AND/OR SC'S WATER QUALITY STANDARDS, IMPLEMENTATION MUST BE COMPLETED BEFORE THE NEXT STORM EVENT WHENEVER PRACTICABLE. IF IMPLEMENTATION BEFORE THE NEXT STORM EVENT IS IMPRACTICABLE, THE SITUATION MUST BE DOCUMENTED IN THE OS-SWPPP AND ALTERNATIVE BMPS MUST BE IMPLEMENTED AS SOON AD REASONABLY POSSIBLE.
16. AN AS-BUILT SURVEY(S), SIGNED AND SEALED BY A S.C. LICENSED LAND SURVEYOR OR PROFESSIONAL ENGINEER, SHOULD BE SUBMITTED TO PIEDMONT COMPANIES, INC. FOR WATER LOCATION AND APPURTENANCES, WASTEWATER CLEANOUTS AND INVERTS, STORM DRAINAGE STRUCTURES, PIPE LOCATION AND INVERTS, AND TOPOGRAPHIC SURVEY OF THE BASINS ON THIS SITE. THE SURVEY(S) SHOULD SHOW CONTOURS AND GRADE DEPTHS FOR ALL STRUCTURES AND SHOULD INCLUDE THE ELEVATIONS AND DIMENSIONS OF ALL OUTLET STRUCTURES, INCLUDING BUT NOT LIMITED TO PIPES, ORIFICES, RISERS, WEIRS, TOP OF DAM, AND EMERGENCY SPILLWAYS.



EXISTING CONDITIONS

REVISION	DATE

APPROVALS | ENGINEER: KMC | DESIGNER: JAM | TECHNICIAN: SNA | CHECKED BY: BSW | APPROVED: KMC

NORTH CAROLINA / SOUTH CAROLINA — CERTIFICATE OF AUTHORIZATION — Alliance Consulting Engineering, Inc. — No. COA2854 — DATE: 04/27/15

NORTH CAROLINA / SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 28279 — SIGNATURE

ALLIANCE CONSULTING ENGINEERS
Alliance Consulting Engineers, Inc.
Post Office Box 8147 Columbia, South Carolina 29202-8147
Phone (803) 779-2078 • Fax (803) 779-2079

SHEET: EXISTING CONDITIONS AND GENERAL NOTES — SCALE: 1" = 20' — DATE: JANUARY 2015

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA — FLORENCE COUNTY — SOUTH CAROLINA

FILE NAME:	SHEET
C1.DWG	C1
REFERENCE FILE:	OF
SURVEY.DWG	C10
PROJECT NO.	
15103-0021	

DWG NO. 01,896-D16

April 27, 2015 - 4:18:47 PM S:\Projects\15103-0021 Site Imprv to the Greenwood Conv Center, Florence Cnty, SC\dwg\Construction Plans\ C1 - Ex, Cond, and Gen. Notes.dwg

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LEGEND

- 109 — EXISTING CONTOUR MINOR
- 110 — EXISTING CONTOUR MAJOR
- PL — EXISTING PROPERTY LINE
- EXISTING ADJACENT PROPERTY LINE
- SD — EXISTING STORM DRAIN
- EXISTING EDGE OF PAVEMENT
- R/W — EXISTING RIGHT-OF-WAY
- OHE — EXISTING OVERHEAD ELECTRIC LINE
- UGP — EXISTING UNDERGROUND POWER LINE
- X — EXISTING FENCE LINE
- EXISTING TREELINE
- 106.59 — EXISTING SPOT ELEVATIONS
- EXISTING PROPERTY PINS
- EXISTING BENCHMARK
- EXISTING POWER POLE
- EXISTING CONCRETE
- EXISTING PAVEMENT
- EXISTING DIRT ROAD
- EXISTING GRAVEL
- LIMITS OF DISTURBANCE
- CLEARING AND GRUBBING AREA
- XXX — EXISTING STRUCTURE TO BE REMOVED
- PROPOSED MILLING
- ASPHALT DEMOLITION

NOTE: UTILITY LOCATIONS ARE APPROXIMATE AND MUST BE FIELD LOCATED PRIOR TO ANY LAND DISTURBANCE BY THE CONTRACTOR.

NOTE: EXISTING GRAVEL WILL RECEIVE MAINTENANCE UPGRADES TO IMPROVE DRIVING SURFACES AND IMPROVE SITE DRAINAGE.

NOTES:
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DEVELOPER INFORMATION

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CONTACT:	MR. ARTHUR CARLIE GREGG, JR., PUBLIC WORKS DIRECTOR
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CITY, STATE:	EFFINGHAM, SOUTH CAROLINA 29541
TELEPHONE:	(843) 665-3022
FAX:	(843) 676-8625
EMAIL:	CGREGG@FLORENCECO.ORG

FLORENCE COUNTY
TM 211-01-090 (REMAINDER)
DB B-470, PG 76

TM 211-01-087
SANDRA C. NICHOLS JONES
DB A894, PG 1144

TM 211-01-063
MAYNARD W. SLACK
DB A504, PG 1731
PB 33, PG 370

TM 211-01-094 (PORTION)

FLORENCE COUNTY
TM 211-01-090
DB A269, PG 2241

CARNELL DRIVE
(30' RIGHT-OF-WAY)

EXISTING FENCE LINE TO BE REMOVED

LIMITS OF DISTURBANCE

10-FOOT SETBACK

EXISTING CONCRETE PAD TO BE REMOVED

EXISTING SEPTIC TANK TO BE PROTECTED DURING CONSTRUCTION

EXISTING CONCRETE PAD AND EXISTING BUILDING TO BE REMOVED

EXISTING WOOD RETAINING WALL TO BE REMOVED

EXISTING CANOPY AND CONCRETE PAD TO BE REMOVED

EXISTING DRIVEWAY TO BE DEMOLISHED TO ADJUST TO NEW GRADES

EXISTING ROLL GATE AND 10 FEET OF EXISTING FENCE LINE TO BE REMOVED (5 FEET EACH SIDE)

30 FEET OF EXISTING FENCE LINE TO BE REMOVED

EXISTING 15" Ø CMP STORM DRAINAGE PIPE TO BE REMOVED
INV. IN = 105.58
INV. OUT = 105.36

EXISTING 12" Ø RCP STORM DRAINAGE PIPE TO BE REMOVED
INV. IN = 105.48
INV. OUT = 105.34

INV. IN = 104.98
INV. OUT = 104.07

INV. IN = 104.18

BENCHMARK
TOP-IRON PIN
NORTHING: 838451.1277
EASTING: 2386305.8728
ELEVATION = 105.82

MILL EXISTING PAVEMENT 50 FEET TO TIE INTO NEW PAVEMENT

BENCHMARK PK NAIL
S18°59'09"E 17.50'
FROM 3/4" PIPE
NORTHING: 838539.2988
EASTING: 2386614.9636
ELEVATION = 106.31

DEMOLITION, CLEARING AND GRUBBING PLAN

20 10 0 20 40
(IN FEET)

REVISION	DATE

APPROVALS	ENGINEER	DESIGNER	TECHNICIAN	CHECKED BY	APPROVED
	KMC	JAM	SNA	BSW	KMC

NORTH CAROLINA NOTARIZED
THIS IS CERTIFICATE OF AUTHORIZATION
Alliance Consulting Engineers, Inc.
Certificate No: C02854
DATE: 01/22/15

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT
KENNETH M. CAMPBELL
No. 28279
SIGNATURE:

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Alliance Consulting Engineers, Inc.
Post Office Box 8147 Columbia, South Carolina 29202/28147
Phone (803) 779-2076 • Fax (803) 779-2079

SCALE: 1" = 20'

SHEET: DEMOLITION, CLEARING AND GRUBBING PLAN

DATE: JANUARY 2015

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA

FLORENCE COUNTY — SOUTH CAROLINA

FILE NAME: C2.DWG
REFERENCE FILE: 15103 BASE.DWG
PROJECT NO. 15103-002I

SHEET C2 OF C10

DWG NO. 01,896-D16

April 27, 2015 - 4:25:03 PM S:\Projects\15103-002I Site Imprv to the Greenwood Conv Center, Florence Cnty, SC\Dwg\Construction Plans\ C2 - Demo., Clearing and Grubbing Plan.dwg

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COLLECTION EQUIPMENT LEGEND (TO BE INSTALLED BY FLORENCE COUNTY)

1. MIXED FUEL TANK
2. CARDBOARD RECYCLING CONTAINER
3. METAL RECYCLING CONTAINER
4. RECYCLING TRAILERS
5. MUNICIPAL SOLID WASTE COMPACTOR
6. YARD WASTE COMPACTOR
7. WASTE TIRE AREA
8. BROWN GOODS AREA
9. TIRE RECYCLING

LEGEND

- EXISTING PROPERTY LINE
- EXISTING ADJACENT PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING RIGHT-OF-WAY
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING UNDERGROUND POWER LINE
- EXISTING FENCE LINE
- EXISTING TREELINE
- EXISTING PROPERTY PINS
- EXISTING BENCHMARK
- EXISTING POWER POLE
- EXISTING CONCRETE
- EXISTING PAVEMENT
- EXISTING DIRT ROAD
- PROPOSED FENCE
- PROPOSED STORM DRAINAGE
- LIMITS OF DISTURBANCE
- PROPOSED WATER LINE
- PROPOSED GRAVEL
- PROPOSED PAVEMENT
- PROPOSED CONCRETE
- PROPOSED SURFACE OVERLAY

NOTE: UTILITY LOCATIONS ARE APPROXIMATE AND MUST BE FIELD LOCATED PRIOR TO ANY LAND DISTURBANCE BY THE CONTRACTOR.

NOTE: EXISTING GRAVEL WILL RECEIVE MAINTENANCE UPGRADES TO IMPROVE DRIVING SURFACES AND IMPROVE SITE DRAINAGE.

NOTES:
CAD FILES WILL BE PROVIDED TO CONTRACTOR FOR USE WITH SITE STAKING.

REFERENCES:

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DB A894, PG 1144

TM 211-01-083
MAYNARD W. SLACK
DB A604, PG 1731
PB 33, PG 370

TM 211-01-094 (PORTION)

TIE NEW FENCE INTO EXISTING FENCE LINE

LIMITS OF DISTURBANCE

10-FOOT SETBACK

FOUR (4) NEW PIPE BOLLARDS TO BE INSTALLED TO PROTECT NEW ELECTRICAL PANEL (APPROXIMATE LOCATION) (SEE DETAIL SHEET C7)

INSTALL YARD HYDRANT

TWO (2) NEW PIPE BOLLARDS TO BE INSTALLED TO PROTECT YARD HYDRANT (APPROXIMATE LOCATION) (SEE DETAIL SHEET C7)

INSTALL YARD HYDRANT

FOUR (4) NEW PIPE BOLLARDS TO BE INSTALLED TO PROTECT YARD HYDRANT (APPROXIMATE LOCATION) (SEE DETAIL SHEET C7)

INSTALL 2-INCH BLACK POLYETHYLENE WATER LINE

CONNECT TO EXISTING WATER LINE (APPROXIMATE LOCATION)

PROPOSED TAPERED RETAINING WALL

INSTALL 12-INCH ASPHALT CURB (SEE DETAIL SHEET C8)

APPLY 4-INCH DASHED LATEX WHITE STRIPING (TYP.) (SEE DETAIL SHEET C8)

APPLY 4-INCH SOLID LATEX WHITE STRIPING (TYP.) (SEE DETAIL SHEET C8)

INSTALL 30-INCH HIGH BLACK CHAIN LINK FENCE WITH THREE (3) 15-FOOT ROLL GATES (SEE DETAIL SHEET C8)

APPLY STRAIGHT ARROWS (TYP.) (SEE DETAIL SHEET C8)

INSTALL 12-INCH ASPHALT CURB (SEE DETAIL SHEET C8)

CONCRETE WALL TO BE EXTENDED (SEE DETAIL SHEET C8)

TOP OF WALL= 113.75 (SEE DETAIL SHEET C8)

PROPOSED TAPERED RETAINING WALL

20-FOOT DOUBLE SWING GATE

SIX (6) NEW PIPE BOLLARDS TO BE INSTALLED TO PROTECT ELECTRICAL EQUIPMENT (APPROXIMATE LOCATION) (SEE DETAIL SHEET C7)

INSTALL STEEL PLATES FOR RECYCLING CONTAINERS (1/4-INCH THICK X 2 FEET WIDE X 25 FEET LONG) (BOLT TO THE CONCRETE EVERY 6 FEET ALONG THE EDGE OF THE STEEL PLATE)

APPLY 4-INCH SOLID LATEX YELLOW STRIPING

APPLY STRAIGHT ARROWS (TYP.)

APPLY 4-INCH SOLID LATEX YELLOW STRIPING (TYP.) (SEE DETAIL SHEET C8)

TIE NEW FENCE INTO EXISTING FENCE LINE

20-FOOT DOUBLE SWING GATE

30-FOOT ROLL GATE

30-FOOT ROLL GATE

LIMITS OF DISTURBANCE

10-FOOT SETBACK

SD 1 = 56 FEET OF 15-INCH Ø RCP @ 0.1%
INV. IN = 104.62
INV. OUT = 104.56

SD 2 = 56 FEET OF 12-INCH Ø RCP @ 0.1%
INV. IN = 104.52
INV. OUT = 104.46

SD 3 = 64 FEET OF 12-INCH Ø RCP @ 0.1%
INV. IN = 104.33
INV. OUT = 104.27

SD 4 = 56 FEET OF 12-INCH Ø RCP @ 0.1%
INV. IN = 104.25
INV. OUT = 104.19

12" Ø RCP

CARNELL DRIVE
(30' RIGHT-OF-WAY)

CONCRETE KEY

BENCHMARK
TOP-IRON PIN
NORTHING: 838451.1277
EASTING: 2386305.8728
ELEVATION = 105.82

PROPOSED SURFACE OVERLAY

BENCHMARK PK NAIL
S18°59'09"E 17.50'
FROM 3/4" PIPE
NORTHING: 838539.2988
EASTING: 2386614.9636
ELEVATION = 106.31

SITE PLAN

(IN FEET)

REVISION	DATE
ADDED RIP-RAP AND ASPHALT AREAS AT ENTRANCE DRIVES	APRIL 30, 2015

APPROVALS: ENGINEER: FMC | DESIGNER: JAM | TECHNICIAN: SNA | CHECKED BY: RW | APPROVED: FMC

I HEREBY CERTIFY THAT THE DESIGN SHOWN HEREON IS IN COMPLIANCE WITH THE LATEST EDITION OF THE SOUTH CAROLINA STORMWATER MANAGEMENT AND SEDIMENT CONTROL REGULATIONS AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.
Alliance Consulting Engineers, Inc.
No. C02654
DATE: 05/04/15

SOUTH CAROLINA PROFESSIONAL ENGINEER
No. 28279
KYLE M. CLAY
SIGNATURE

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PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA
FLORENCE COUNTY — SOUTH CAROLINA

SHEET: SITE PLAN
SCALE: 1" = 20'
DATE: JANUARY 2015

FILE NAME: C3.DWG
REFERENCE FILE: 15103 BASE.DWG
PROJECT NO. 15103-0021
SHEET C3 OF C10
DWG NO. 01.896-D16

May 05, 2015, 9:23:01 PM S:\Projects\15103.0021 Site Impvs to the Greenwood Conv Center Florence Cnty, SC\Dwg\Construction Plans\C3 - Site Plan.dwg

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EXISTING ADJACENT PROPERTY LINE	EXISTING CONCRETE
EXISTING EDGE OF PAVEMENT	EXISTING PAVEMENT
R/W — EXISTING RIGHT-OF-WAY	EXISTING DIRT ROAD
OHE — EXISTING OVERHEAD ELECTRIC LINE	LIMITS OF DISTURBANCE
UGP — EXISTING UNDERGROUND POWER LINE	PROPOSED FENCE
EXISTING FENCE LINE	
EXISTING TREELINE	
106.59 — EXISTING SPOT ELEVATIONS	

SD — PROPOSED STORM DRAINAGE	
110 — PROPOSED MAJOR CONTOURS	
109 — PROPOSED MINOR CONTOURS	
106.12 — PROPOSED SPOT ELEVATIONS	
PROPOSED GRAVEL	
PROPOSED PAVEMENT	
PROPOSED CONCRETE	
PROPOSED SURFACE OVERLAY	

NOTE: UTILITY LOCATIONS ARE APPROXIMATE AND MUST BE FIELD LOCATED PRIOR TO ANY LAND DISTURBANCE BY THE CONTRACTOR

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REFERENCES:

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CITY, STATE:	EFFINGHAM, SOUTH CAROLINA 29541
TELEPHONE:	(843) 665-3022
FAX:	(843) 676-8625
EMAIL:	CGREGG@FLORENCECO.ORG

REVISION	DATE
ADDED OUTFALL DITCH AND ASSOCIATED GRADING REVISIONS PER PERMITTING ENTITY	APRIL 30, 2015

APPROVALS	
ENGINEER	KMC
DESIGNER	JAM
DRAWN BY	SNA
CHECKED BY	RVW
APPROVED	KMC

SOUTH CAROLINA PROFESSIONAL ENGINEER — KYLE M. CLARK — No. 28279 — Alliance Consulting Engineers, Inc. No. 4102845 — DATE:

SOUTH CAROLINA PROFESSIONAL LANDSCAPE ARCHITECT — No. 1523 — SIGNATURE:

ALLIANCE CONSULTING ENGINEERS
Alliance Consulting Engineers, Inc
Post Office Box 8147 Columbia, South Carolina 29202-8147
Phone (803) 779-2078 Fax (803) 779-2013

SHEET: GRADING AND STORM DRAINAGE PLAN — SCALE: 1" = 20' — DATE: JANUARY 2015

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA — FLORENCE COUNTY, SOUTH CAROLINA

FILE NAME: C4.DWG	SHEET C4
REFERENCE FILE: 15103 BASE.DWG	OF C10
PROJECT NO. 15103-0021	
DWG NO. 01.896-D16	

FLORENCE COUNTY
TM 211-01-090 (REMAINDER)
DB B-470, PG 76

TM 211-01-087
SANDRA C. NICHOLS JONES
DB A894, PG 1144

TM 211-01-063
MAYNARD W. SLACK
DB A504, PG 1731
PB 33, PG 370

TM 211-01-094 (PORTION)

LIMITS OF DISTURBANCE

TOW:113.75
BOW:112.75

CONCRETE WALL TO BE EXTENDED (SEE DETAIL SHEET C8)

TOP OF WALL= 113.75 (SEE DETAIL SHEET C8)

TOW:112.05
BOW:110.75

TOW:112.03

TOW:108.5

SD 1 = 56 FEET OF 15-INCH Ø RCP @ 0.1%
INV. IN = 104.62
INV. OUT = 104.56

SD 2 = 56 FEET OF 12-INCH Ø RCP @ 0.1%
INV. IN = 104.52
INV. OUT = 104.46

SD 3 = 64 FEET OF 12-INCH Ø RCP @ 0.1%
INV. IN = 104.33
INV. OUT = 104.27

SD 4 = 56 FEET OF 12-INCH Ø RCP @ 0.1%
INV. IN = 104.25
INV. OUT = 104.19

INV. OUT = 104.07
INV. IN = 104.18

CARNELL DRIVE
(30' RIGHT-OF-WAY)

CONCRETE KEY

BENCHMARK
TOP-IRON PIN
NORTHING: 838451.1277
EASTING: 2386305.8728
ELEVATION = 105.82

PROPOSED SURFACE OVERLAY

BENCHMARK PK NAIL
S18°59'09"E 17.50'
FROM 3/4" PIPE
NORTHING: 838539.2988
EASTING: 2386614.9636
ELEVATION = 106.31

GRADING AND STORM DRAINAGE PLAN

(IN FEET)

May 06, 2015 - 3:34:07 PM S:\Projects\15103\001 Site Improvements\Greenwood Conv Center - Florence Co, SC\Design\Construction Plans\C4 - Grading and SW Plan.dwg

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LEGEND

108 EXISTING CONTOUR MINOR	EXISTING PROPERTY PINS
110 EXISTING CONTOUR MAJOR	EXISTING BENCHMARK
PL EXISTING PROPERTY LINE	EXISTING POWER POLE
EXISTING ADJACENT PROPERTY LINE	EXISTING CONCRETE
EXISTING EDGE OF PAVEMENT	EXISTING PAVEMENT
R/W EXISTING RIGHT-OF-WAY	EXISTING DIRT ROAD
OHE EXISTING OVERHEAD ELECTRIC LINE	LIMITS OF DISTURBANCE
UGP EXISTING UNDERGROUND POWER LINE	PROPOSED FENCE
EXISTING FENCE LINE	
EXISTING TREELINE	
106.59 EXISTING SPOT ELEVATIONS	

SD PROPOSED STORM DRAINAGE	GRASSING
110 PROPOSED MAJOR CONTOURS	ST SEDIMENT TUBES
108 PROPOSED MINOR CONTOURS	RR RIP RAP OUTLET PROTECTION
106.12 PROPOSED SPOT ELEVATIONS	CE CONSTRUCTION ENTRANCE/EXIT
PROPOSED GRAVEL	
PROPOSED PAVEMENT	
PROPOSED CONCRETE	
SF SILT FENCE	

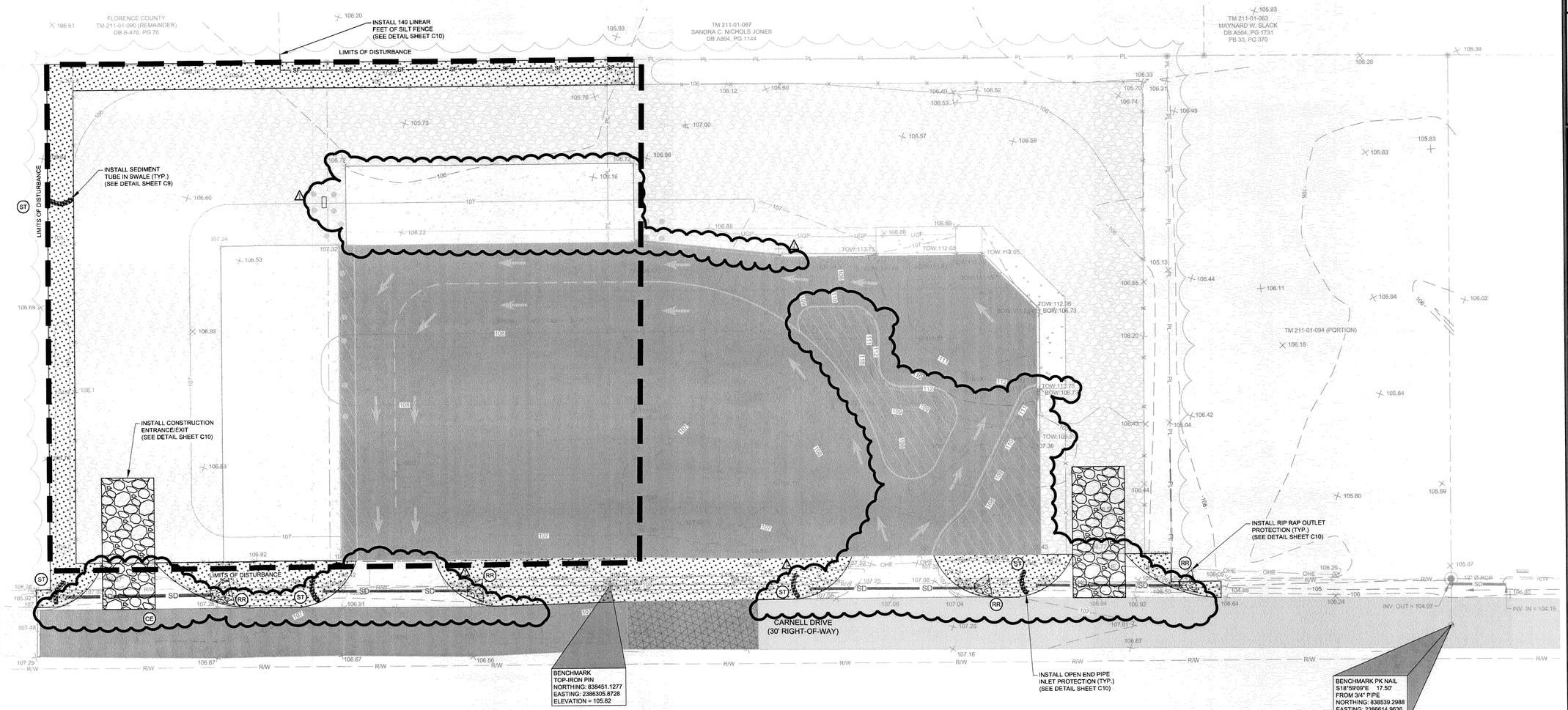
NOTE: UTILITY LOCATIONS ARE APPROXIMATE AND MUST BE FIELD LOCATED PRIOR TO ANY LAND DISTURBANCE BY THE CONTRACTOR.

NOTES:
CAD FILES WILL BE PROVIDED TO CONTRACTOR FOR USE WITH SITE STAKING.

REFERENCES:
1. REFERENCE IS MADE TO AN ALTA/ACSM LAND TITLE SURVEY WITH TOPOGRAPHIC AND EXISTING CONDITIONS BY JONATHAN W. NESBITT OF NESBITT SURVEYING CO., INC. FOR FLORENCE COUNTY DATED JANUARY 30, 2015.

DEVELOPER INFORMATION

OWNER:	FLORENCE COUNTY
CONTACT:	MR. ARTHUR CARLIE GREGG, JR., PUBLIC WORKS DIRECTOR
ADDRESS:	6746 FRIENDFIELD ROAD, POST OFFICE BOX 38
CITY, STATE:	EFFINGHAM, SOUTH CAROLINA 29541
TELEPHONE:	(843) 665-3022
FAX:	(843) 676-8625
EMAIL:	CGREGG@FLORENCECO.ORG



EROSION AND SEDIMENT CONTROL PLAN

(IN FEET)

REVISION	DATE
CONCRETE DRIVES AND ASPHALT ADDED TO EXISTING DIRT ROAD	APRIL 30, 2015

APPROVALS	
ENGINEER	KMG
DESIGNER	JAM
TECHNICIAN	SNA
CHECKED BY	BSW
APPROVED	KMG

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26279 KYLE M. GREGG — STATUS CERTIFICATE OF AUTHORIZATION Alliance Consulting Engineers, Inc. No. C02854 — DATE / SIGNATURE

ALLIANCE CONSULTING ENGINEERS
Alliance Consulting Engineers, Inc.
Post Office Box 8147 Columbia, South Carolina 29202-8147
Phone (803) 779-2078 • Fax (803) 779-2079

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA
FLORENCE COUNTY — SOUTH CAROLINA

SHEET: EROSION AND SEDIMENT CONTROL PLAN
SCALE: 1" = 20'
DATE: JANUARY 2015

FILE NAME:	C5.DWG
REFERENCE FILE:	15103 BASE.DWG
PROJECT NO.	15103-0021
SHEET	C5 OF C10
DWG NO.	01.896-DI6

May 06, 2015 - 3:55:5 PM S:\Projects\15103.dwg, 15103 for Greenwood Conv Center (Florence Co)_Civil\Construction Plans\C5 - Erosion and Sediment Control Plan.dwg

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NOTE: UTILITY LOCATIONS ARE APPROXIMATE AND MUST BE FIELD LOCATED PRIOR TO ANY LAND DISTURBANCE BY THE CONTRACTOR.

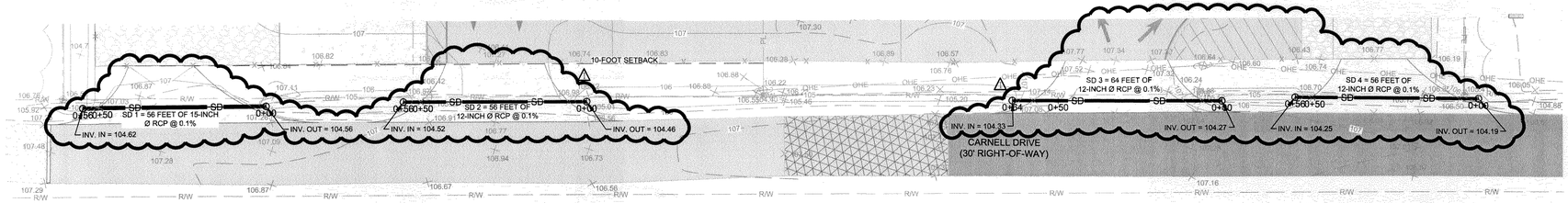
NOTES:
CAD FILES WILL BE PROVIDED TO CONTRACTOR FOR USE WITH SITE STAKING.

REFERENCES:

1. REFERENCE IS MADE TO AN ALTA/ACSM LAND TITLE SURVEY WITH TOPOGRAPHIC AND EXISTING CONDITIONS BY JONATHAN W. NESBITT OF NESBITT SURVEYING CO., INC. FOR FLORENCE COUNTY DATED JANUARY 30, 2015.

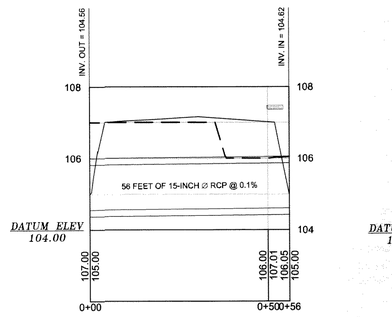
DEVELOPER INFORMATION

OWNER:	FLORENCE COUNTY
CONTACT:	MR. ARTHUR CARLIE GREGG, JR., PUBLIC WORKS DIRECTOR
ADDRESS:	6746 FRIENDFIELD ROAD, POST OFFICE BOX 38
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TELEPHONE:	(843) 665-3022
FAX:	(843) 676-8625
EMAIL:	CGREGG@FLORENCECO.ORG

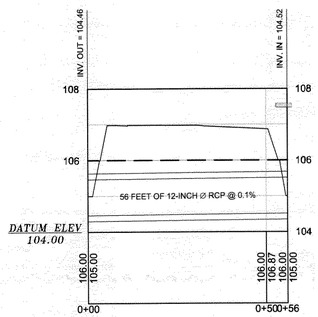


STORM DRAINAGE PLAN

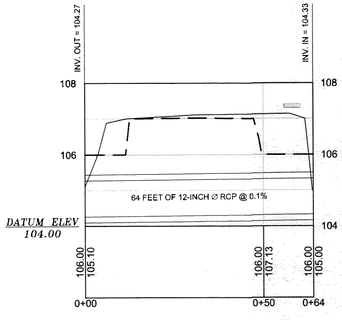
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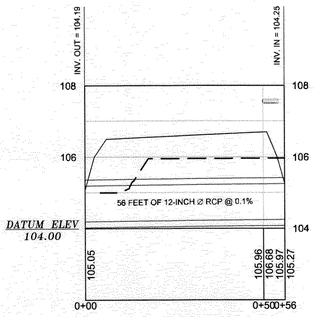
SD 1



SD 2



SD 3



SD 4

STORM DRAINAGE PROFILES

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'

REVISION	DATE
CONCRETE DRIVES AND ASPHALT AREAS REVISIONS PER FLORENCE CLIENTS	APRIL 30, 2015

APPROVALS: ENGINEER KMC | DESIGNER JAM | TECHNICIAN SNA | CHECKED BY RSW | APPROVED KMC

NORTH CAROLINA LICENSURE — Alliance Consulting Engineers, Inc. No. C02854 — HYDROLOGIC CERTIFICATE — DATE

STATE OF SOUTH CAROLINA — CARLIE J. KYTLE — No. 29279 — PROFESSIONAL ENGINEER — 0393251039 — SIGNATURE

ALLIANCE CONSULTING ENGINEERS
Alliance Consulting Engineers, Inc.
Post Office Box 8147 Columbia, South Carolina 29202-8147
Phone (803) 779-2078 • Fax (803) 779-2079

SHEET: STORM DRAINAGE PROFILES — SCALE: AS SHOWN — DATE: JANUARY 2015

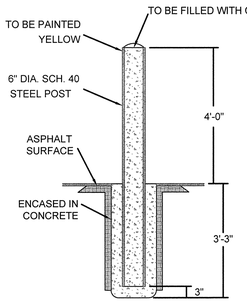
PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA — FLORENCE COUNTY — SOUTH CAROLINA

FILE NAME:	SHEET
C6.DWG	C6
REFERENCE FILE: 15103 BASE.DWG	OF
PROJECT NO. 15103-0021	C10

DWG NO. 01,896-D16

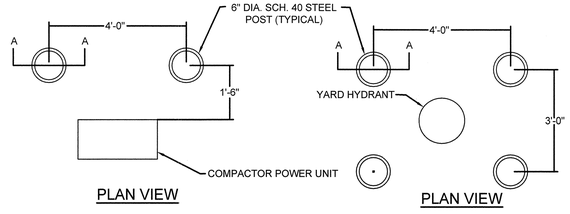
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SECTION A-A

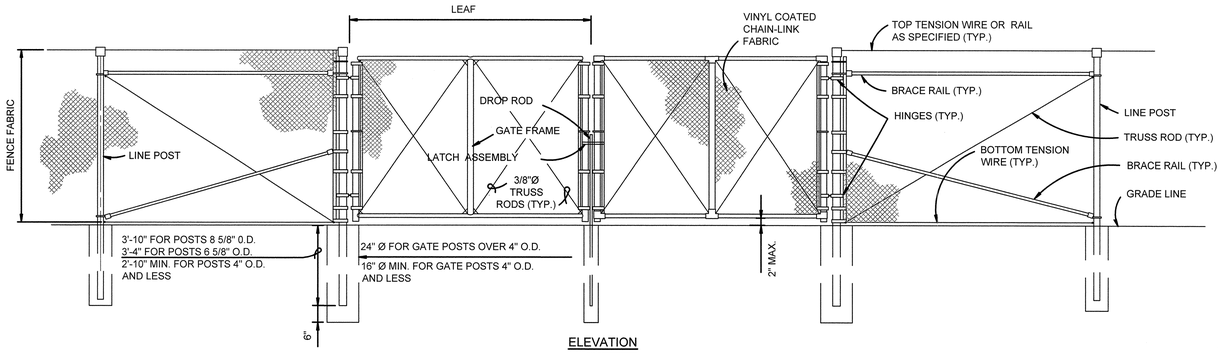
STANDARD DETAIL WC# 4A
NOT TO SCALE



PIPE BOLLARD DETAIL

NOT TO SCALE

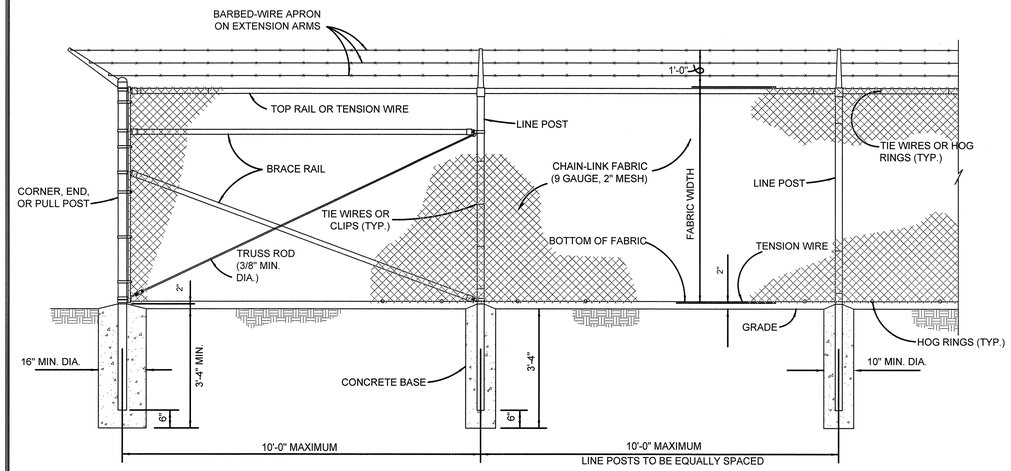
NOTE:
MINIMUM POST DEPTH IN FOOTING MAY BE INCREASED AS NECESSARY IN AREAS OF HEAVY TRUCK TRAFFIC OR AS DETERMINED BY THE ENGINEER.



ELEVATION

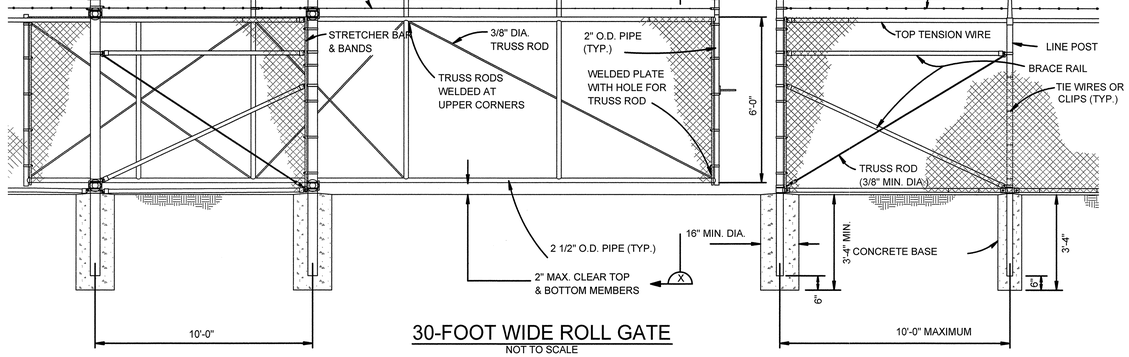
20-FOOT WIDE DOUBLE SWING GATE

NOT TO SCALE



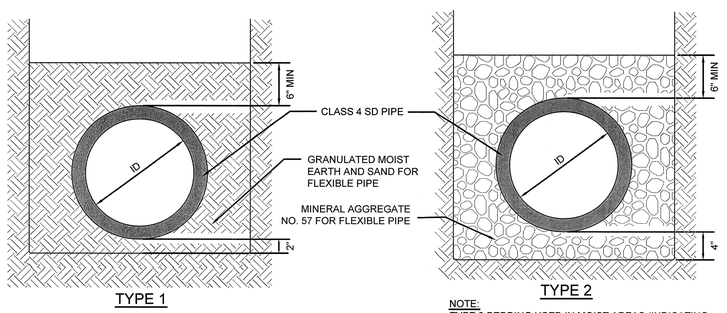
CHAIN-LINK SECURITY FENCE DETAIL

NOT TO SCALE



30-FOOT WIDE ROLL GATE

NOT TO SCALE



NOTE:
TYPE 2 BEDDING USED IN MOIST AREAS (INDICATING GROUNDWATER) AND HIGH TRAFFIC AREAS.

CLASS "B" BEDDING

NOT TO SCALE

STORM DRAINAGE CHART

SD Pipe No.	Inv In	Inv out	Pipe
SD 1	104.62	104.56	56' of 15" RCP @ 0.10% slope
SD 2	104.52	104.46	56' of 12" RCP @ 0.10% slope
SD 3	104.33	104.27	64' of 12" RCP @ 0.10% slope
SD 4	104.23	104.19	56' of 12" RCP @ 0.10% slope

DEVELOPER INFORMATION

OWNER:	FLORENCE COUNTY
CONTACT:	MR. ARTHUR CARLIE GREGG, JR., PUBLIC WORKS DIRECTOR
ADDRESS:	6746 FRIENDFIELD ROAD, POST OFFICE BOX 38
CITY, STATE:	EFFINGHAM, SOUTH CAROLINA 29541
TELEPHONE:	(843) 665-3022
FAX:	(843) 678-8625
EMAIL:	CGREGG@FLORENCECO.ORG

REVISION	DATE

APPROVALS: ENGINEER KMC | DESIGNER JAM | DETAILING SNA | CHECKED BY RSW | APPROVED KMC

CERTIFICATE OF AUTHORIZATION — Alliance Consulting Engineers, Inc. No. C02854 — DATE: 01/12/16

SIGNATURE

ALLIANCE CONSULTING ENGINEERS

Alliance Consulting Engineers, Inc.
Post Office Box 8147 Columbia, South Carolina 29202-8147
Phone (803) 779-2079 • Fax (803) 779-2079

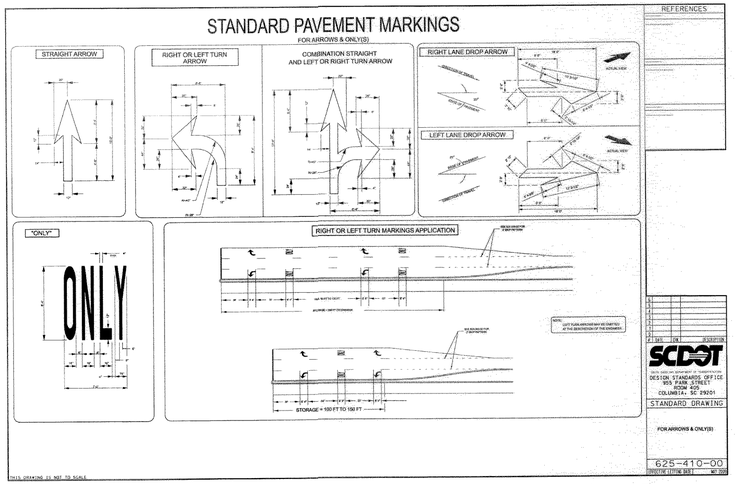
SHEET: SITE DETAILS (SHEET 1 OF 2) | SCALE: N.T.S. | DATE: JANUARY 2015

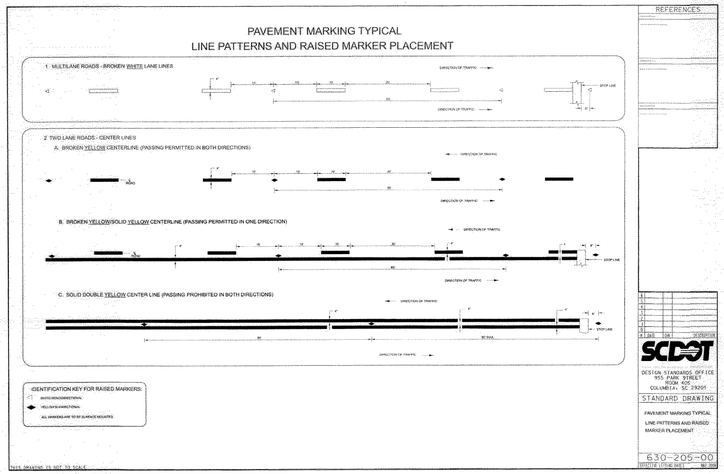
PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA — FLORENCE COUNTY — SOUTH CAROLINA

FILE NAME:	SHEET
C7.DWG	C7
REFERENCE FILE: 15103 BASE.DWG	OF
PROJECT NO. 15103-0021	C10

DWG NO. 01.896-D16

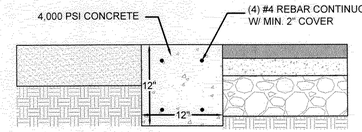
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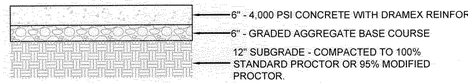


DEVELOPER INFORMATION

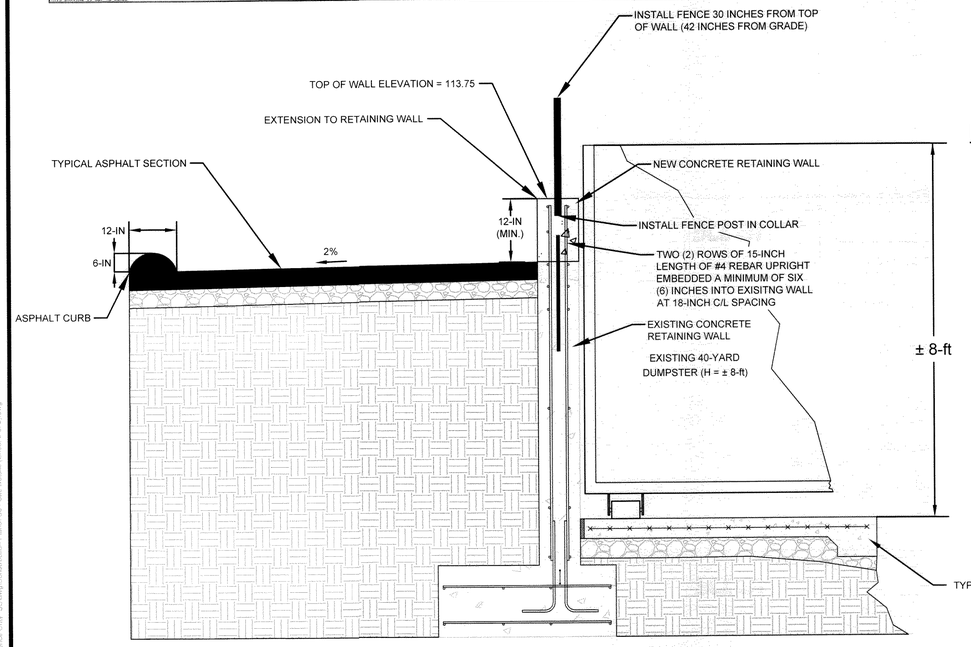
OWNER:	FLORENCE COUNTY
CONTACT:	MR. ARTHUR CARLIE GREGG, JR., PUBLIC WORKS DIRECTOR
ADDRESS:	6746 FRIENDFIELD ROAD, POST OFFICE BOX 38
CITY, STATE:	EFFINGHAM, SOUTH CAROLINA 29541
TELEPHONE:	(843) 665-3022
FAX:	(843) 676-8025
EMAIL:	CGREGG@FLORENCECO.ORG



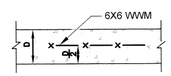
CONCRETE KEY DETAIL
NOT TO SCALE



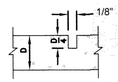
TYPICAL CONCRETE PAVEMENT SECTION
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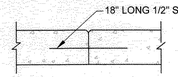
RETAINING WALL EXTENSION
NOT TO SCALE



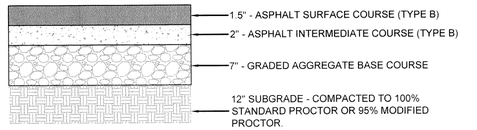
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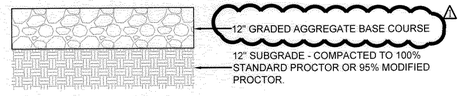
SAW JOINT DETAIL
NOT TO SCALE



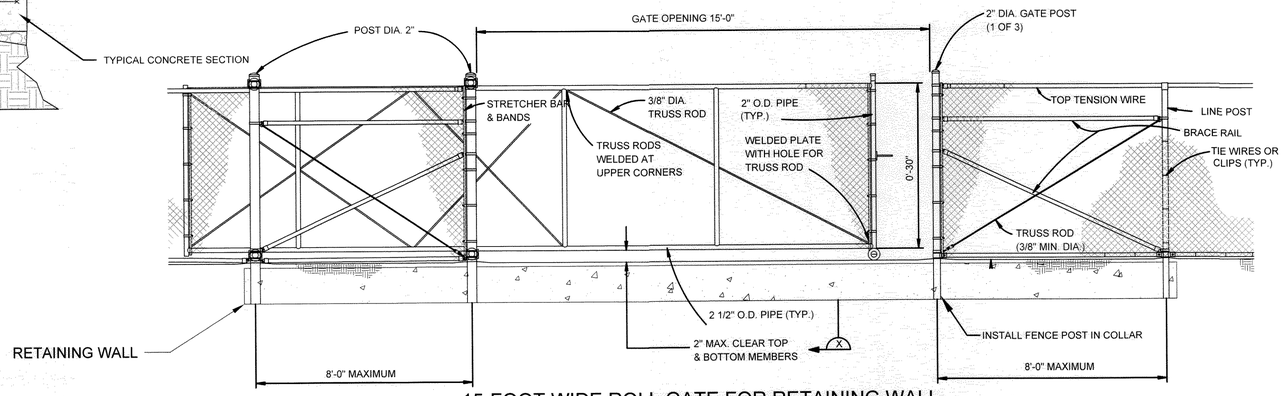
CONSTRUCTION/COLD JOINT DETAIL
NOT TO SCALE



TYPICAL ASPHALT PAVEMENT SECTION
NOT TO SCALE



TYPICAL GRAVEL PAVEMENT SECTION
NOT TO SCALE



15-FOOT WIDE ROLL GATE FOR RETAINING WALL
NOT TO SCALE

REVISION	DATE
1 CONCRETE DRIVES AND ASPHALT AREAS ADDED PER ENGINEERS COMMENTS	APRIL 30, 2015
2	
3	
4	
5	

APPROVALS: ENGINEER KMC | DESIGNED JAM | TECHNICIAN RNA | CHECKED BY BSW | APPROVED KMC

NORTH CAROLINA AUTHORIZATION — Alliance Consulting Engineers, Inc. No. C02854 — CERTIFICATE OF AUTHORIZATION — DATE:

NORTH CAROLINA — PROFESSIONAL ENGINEER — No. 28279 — KYLE M. CLARK — SEAL/SIGNATURE

ALLIANCE CONSULTING ENGINEERS
Alliance Consulting Engineers, Inc
Post Office Box 8147 • Columbia, South Carolina 29202-8147
Phone (803) 779-2078 • Fax (803) 779-2079

SHEET: SITE DETAILS (SHEET 2 OF 2) — SCALE: N.T.S. — DATE: JANUARY 2015

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA — FLORENCE COUNTY — SOUTH CAROLINA

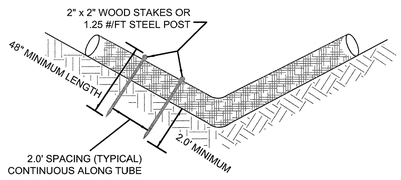
FILE NAME:	SHEET
C8.DWG	C8
REFERENCE FILE: 15103 BASE.DWG	OF C10
PROJECT NO. 15103-002I	

DWG NO. 01.896-D16

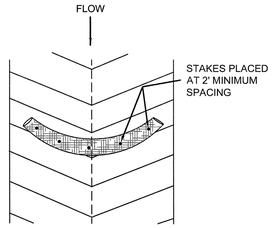
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May 05, 2015 - 8:39:21 AM S:\Projects\15103-002I_Civil_Engineering\Plans\Cover Sheet.dwg, C8 - Site Details (Sheet 7 of 7).dwg

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END VIEW OF DITCH



TOP VIEW OF DITCH

SEDIMENT TUBE
(SCDHEC DETAIL SC-05, pg 1 of 3)

DESCRIPTION

SEDIMENT TUBES ARE ELONGATED TUBES OF COMPACTED GEOTEXTILES, CURLED EXCELSIOR WOOD, NATURAL COCONUT FIBER, OR HARDWOOD MULCH. STRAW, PINE NEEDLES, AND LEAF MULCH-FILLED SEDIMENT TUBES ARE NOT PERMITTED UNDER THIS SPECIFICATION.

WHEN AND WHERE TO USE IT

INSTALL SEDIMENT TUBES ALONG CONTOURS, IN DRAINAGE CONVEYANCE SWALES, AND AROUND INLETS TO HELP REDUCE THE EFFECTS OF SOIL EROSION BY ENERGY DISSIPATION AND RETAIN SEDIMENT.

MATERIALS

SEDIMENT TUBES FOR DITCH CHECKS AND TYPE A INLET STRUCTURE FILTERS EXHIBIT THE FOLLOWING PROPERTIES:
- PRODUCED BY A MANUFACTURER EXPERIENCED IN SEDIMENT TUBE MANUFACTURING
- COMPOSED OF COMPACTED GEOTEXTILES, CURLED EXCELSIOR WOOD, NATURAL COCONUT FIBERS, HARDWOOD MULCH, OR A MIX OF THESE MATERIALS ENCLOSED BY A FLEXIBLE NETTING MATERIAL
- STRAW, STRAW FIBER, STRAW BALES, PINE NEEDLES, AND LEAF MULCH ARE NOT ALLOWED UNDER THIS SPECIFICATION.
- UTILIZES OUTER NETTING THAT CONSISTS OF SEAMLESS, HIGH-DENSITY POLYETHYLENE, PHOTODEGRADABLE MATERIALS TREATED WITH ULTRAVIOLET STABILIZERS OR SEAMLESS, HIGH-DENSITY POLYETHYLENE, NON-DEGRADABLE MATERIALS
- DIAMETER RANGING FROM 18-INCHES TO 24-INCHES

CURLED EXCELSIOR WOOD OR NATURAL COCONUT ROLLED EROSION CONTROL PRODUCTS (RECPs) THAT ARE ROLLED UP TO CREATE A SEDIMENT TUBE ARE NOT ALLOWED UNDER THIS SPECIFICATION.

INSTALLATION

INSTALL OVER BARE SOIL, MULCHED AREAS, OR EROSION CONTROL BLANKETS.

SEDIMENT TUBES MUST BE COMPOSED OF GEOTEXTILES, CURLED EXCELSIOR WOOD, NATURAL COCONUT FIBER, OR HARDWOOD MULCH ENCLOSED BY A FLEXIBLE NETTING MATERIAL. STRAW, STRAW FIBER, STRAW BALES, PINE NEEDLES, AND LEAF MULCH ARE NOT ALLOWED.

THE MINIMUM DIAMETER SHOULD BE 18 INCHES.

SEDIMENT TUBES SHOULD BE STAKED USING WOODEN STAKES (2-INCH x 2-INCH) OR STEEL POSTS (STANDARD "U" OR "T" SECTIONS WITH A MINIMUM WEIGHT OF 1.25 POUNDS PER FOOT), A MINIMUM OF 48-INCHES IN LENGTH, PLACED ON 2-FOOT CENTERS.

STAKES SHOULD BE INTERTWINED WITH THE OUTER MESH ON THE DOWNSTREAM SIDE AND DRIVEN IN THE GROUND TO A MINIMUM DEPTH OF 1.5 FEET, LEAVING LESS THAN 1 FOOT OF STAKE EXPOSED ABOVE THE SEDIMENT TUBE. ALWAYS REFER TO THE MANUFACTURER'S RECOMMENDATIONS FOR THE STAKING DETAIL.

INSTALL ALL SEDIMENT TUBES INSURING THAT NO GAPS EXIST BETWEEN THE SOIL AND THE BOTTOM OF THE SEDIMENT TUBE. THE ENDS OF ADJACENT SEDIMENT TUBES SHOULD BE LAPPED 6-INCH TO PREVENT FLOW AND SEDIMENT FROM PASSING THROUGH THE FIELD JOINT. IN NO SITUATIONS SHOULD SEDIMENT TUBES BE STACKED ON TOP OF ONE ANOTHER.

CONSTUCT A TRENCH THAT IS 20% OF THE TUBE DIAMETER TO INSTALL THE TUBE IN.

AVOID DAMAGE TO SEDIMENT TUBES WHILE INSTALLING THEM. IF THE SEDIMENT TUBE BECOMES DAMAGED DURING INSTALLATION, A STAKE SHOULD BE PLACED ON BOTH SIDES OF THE DAMAGED AREA TERMINATING THE TUBE SEGMENT AND A NEW TUBE SEGMENT SHOULD BE INSTALLED.

SEDIMENT TUBES SHOULD BE INSTALLED IN SWALES OR DRAINAGE DITCHES PERPENDICULAR TO THE FLOW OF WATER

SEDIMENT TUBES SHOULD CONTINUE UP THE SIDE SLOPES A MINIMUM OF 1-FOOT ABOVE THE DESIGN FLOW DEPTH. SEDIMENT TUBES SHOULD BE SPACED ACCORDING TO THE FOLLOWING TABLE.

SEDIMENT TUBE SPACING

SLOPE	MAXIMUM SEDIMENT TUBE SPACING
LESS THAN 2%	150-FEET
2%	100-FEET
3%	75-FEET
4%	50-FEET
5%	40-FEET
6%	30-FEET
GREATER THAN 6%	25-FEET

SEDIMENT TUBE
(SCDHEC DETAIL SC-05, pg 2 of 3)

SEDIMENT TUBE LENGTH SELECTED SHOULD MINIMIZE THE NUMBER OF SEDIMENT TUBES NEEDED TO SPAN THE WIDTH OF THE DRAINAGE CONVEYANCE. IF THE DITCH CHECK LENGTH (PERPENDICULAR TO THE WATER FLOW) IS 15 FEET, THEN ONE 15-FOOT SEDIMENT TUBE IS
PREFERRED COMPARED TO TWO OVERLAPPING 10-FOOT SEDIMENT TUBES.

SEDIMENT TUBES FOR DITCH CHECKS SHOULD REMAIN IN PLACE UNTIL FULLY ESTABLISHED VEGETATION AND ROOT SYSTEMS HAVE
COMPLETELY DEVELOPED AND CAN SURVIVE ON THEIR OWN.

INSPECTION AND MAINTENANCE

CHECK DAMS SHOULD BE INSPECTED EVERY 7 CALENDAR DAYS AND WITHIN 24-HOURS AFTER EACH STORM THAT PRODUCES ½-INCHES OR MORE OF RAIN TO ENSURE CONTINUED EFFECTIVENESS.

LARGE DEBRIS, TRASH, AND LEAVES SHOULD BE REMOVED.

IF EROSION CAUSES THE EDGES TO FALL TO A HEIGHT EQUAL TO OR BELOW THE HEIGHT OF THE CENTER, REPAIRS SHOULD BE MADE IMMEDIATELY.

REMOVE ACCUMULATED SEDIMENT FROM THE UPSTREAM SIDE OF THE SEDIMENT TUBE WHEN THE SEDIMENT HAS REACHED A HEIGHT OF APPROXIMATELY ONE-THIRD OF THE EXPOSED HEIGHT OF THE TUBE (MEASURED AT THE CENTER).

ACCUMULATED SEDIMENT SHOULD BE REMOVED PRIOR TO REMOVING SEDIMENT TUBES.

SEDIMENT TUBE REMOVAL SHOULD BE COMPLETED ONLY AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN COMPLETELY STABILIZED. PERMANENT VEGETATION SHOULD REPLACE AREAS FROM WHICH GRAVEL, STONE, SEDIMENT TUBES, OR OTHER MATERIALS HAVE BEEN REMOVED.

SEDIMENT TUBE
(SCDHEC DETAIL SC-05, pg 3 of 3)

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SHEET: EROSION AND SEDIMENT CONTROL DETAILS (SHEET 1 OF 2)
SCALE: N. T. S.
DATE: JANUARY 2015

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA
FLORENCE COUNTY SOUTH CAROLINA

FILE NAME: C9.DWG
REFERENCE FILE: 15103 BASE.DWG
PROJECT NO. 15103-0021
SHEET C9 OF C10
DWG NO. 01.896-D16

April 24, 2015 - 10:58:30 AM S:\Projects\15103-0021 Site Impr to the Greenwood Conv Center, Florence Cnty, SC\dwg\Construction Plans\ C9 - Erosion and Sediment Control Details (Sheet 1 of 2).dwg

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SEDIMENT AND EROSION CONTROL NOTES

STANDARD NOTES:

1. SLOPES, WHICH EXCEED EIGHT (8) VERTICAL FEET SHOULD BE STABILIZED WITH EROSION CONTROL MATS, IN ADDITION TO HYDROSEEDING. IT MAY BE NECESSARY TO INSTALL TEMPORARY SLOPE DRAINS DURING CONSTRUCTION. TEMPORARY BERMS MAY BE NEEDED UNTIL THE SLOPE IS BROUGHT TO GRADE.
2. STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN FOURTEEN (14) DAYS AFTER WORK HAS CEASED, EXCEPT AS STATED BELOW.
   - WHERE STABILIZATION BY THE 14TH DAY IS PRECLUDED BY SNOW COVER OR FROZEN GROUND CONDITIONS STABILIZATION MEASURES MUST BE INITIATED AS SOON AS PRACTICABLE.
   - WHERE CONSTRUCTION ACTIVITY ON A PORTION OF THE SITE IS TEMPORARILY CEASED, AND EARTH-DISTURBING ACTIVITIES WILL BE RESUMED WITHIN FOURTEEN (14) DAYS, TEMPORARY STABILIZATION MEASURES DO NOT HAVE TO BE INITIATED ON THAT PORTION OF THE SITE.
3. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE INSPECTED EVERY SEVEN (7) DAYS. IF SITE INSPECTIONS IDENTIFY BMPS THAT ARE DAMAGED OR ARE NOT OPERATING EFFECTIVELY, MAINTENANCE MUST BE PERFORMED AS SOON AS PRACTICAL OR AS REASONABLY POSSIBLE AND BEFORE THE NEXT STORM EVENT WHENEVER PRACTICABLE.
4. PROVIDE SILT FENCE AND/OR OTHER CONTROL DEVICES, AS MAY BE REQUIRED, TO CONTROL SOIL EROSION DURING UTILITY CONSTRUCTION. ALL DISTURBED AREAS SHALL BE CLEANED, GRADED, AND STABILIZED WITH GRASSING IMMEDIATELY AFTER THE UTILITY INSTALLATION. FILL, COVER, AND TEMPORARY SEEDING AT THE END OF EACH DAY ARE RECOMMENDED. IF WATER IS ENCOUNTERED WHILE TRENCHING, THE WATER SHOULD BE FILTERED TO REMOVE ANY SEDIMENTS BEFORE BEING PUMPED BACK INTO ANY WATERS OF THE STATE.
5. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFFSITE SEDIMENTATION. ALL TEMPORARY CONTROL DEVICES SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
6. THE CONTRACTOR MUST TAKE NECESSARY ACTION TO MINIMIZE THE TRACKING OF MUD ONTO PAVED ROADWAY(S) FROM CONSTRUCTION AREAS AND THE GENERATION OF DUST. THE CONTRACTOR SHALL DAILY REMOVE MUD/SOIL FROM PAVEMENT, AS MAY BE REQUIRED.
7. RESIDENTIAL SUBDIVISIONS REQUIRE EROSION CONTROL FEATURES FOR INFRASTRUCTURE AS WELL AS FOR INDIVIDUAL LOT CONSTRUCTION. INDIVIDUAL PROPERTY OWNERS SHALL FOLLOW THESE PLANS DURING CONSTRUCTION OR OBTAIN APPROVAL OF AN INDIVIDUAL PLAN IN ACCORDANCE WITH S.C REG. 72-300 ET SEQ. AND SCR100000.
8. TEMPORARY DIVERSION BERMS AND/OR DITCHES WILL BE PROVIDED AS NEEDED DURING CONSTRUCTION TO PROTECT WORK AREAS FROM UPSLOPE RUNOFF AND/OR TO DIVERT SEDIMENT-LADEN WATER TO APPROPRIATE TRAPS OR STABLE OUTLETS.
9. ALL WATERS OF THE STATE (WOS), INCLUDING WETLANDS, ARE TO BE FLAGGED OR OTHERWISE CLEARLY MARKED IN THE FIELD. A DOUBLE ROW OF SILT FENCE IS TO BE INSTALLED IN ALL AREAS WHERE A 50-FOOT BUFFER CAN'T BE MAINTAINED BETWEEN THE DISTURBED AREA AND ALL WOS. A 10-FOOT BUFFER SHOULD BE MAINTAINED BETWEEN THE LAST ROW OF SILT FENCE AND ALL WOS.
10. LITTER, CONSTRUCTION DEBRIS, OILS, FUELS, AND BUILDING PRODUCTS WITH SIGNIFICANT POTENTIAL FOR IMPACT (SUCH AS STOCKPILES OF FRESHLY TREATED LUMBER) AND CONSTRUCTION CHEMICALS THAT COULD BE EXPOSED TO STORM WATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE IN STORM WATER DISCHARGES.

ADDITIONAL NOTES:

A. INSTALL PERMANENT VEGETATIVE COVER AND THE LONG-TERM EROSION PROTECTION MEASURES OR STRUCTURES AS SOON AS PRACTICAL IN THE DEVELOPMENT PROCESS.
B. PROVIDE FOR HANDLING THE INCREASED RUNOFF CAUSED BY CHANGED SOIL AND SURFACE CONDITIONS. USE EFFECTIVE MEANS TO CONSERVE EXISTING ON-SITE SOIL INCLUDING THE USE OF DIVERSION DITCHES, GRASSED WATERWAYS AND STORM SEWERS.
C. PLACE SILT FENCE BARRIERS AT LOCATIONS SHOWN ON PLAN. SILT BARRIERS SHALL BE MAINTAINED IN PLACE AND IN GOOD CONDITION UNTIL GROUND COVER IS ESTABLISHED.
D. ALL DISTURBED AREAS NOT PAVED SHALL BE GRASSED. USE TEMPORARY PLANT COVER, MULCHING, AND/OR STRUCTURES TO CONTROL RUNOFF AND PROTECT AREAS SUBJECT TO EROSION DURING CONSTRUCTION.
E. SEDIMENT PONDS ARE TO BE EXCAVATED TO ORIGINAL GRADES UPON THE ACCUMULATION OF 1.5' ON SEDIMENT STAKE PLACED AT OUTLET.
F. PROVIDE A TEMPORARY STONE SPLASH PAD AT ALL FIRE HYDRANTS OR OTHER POINTS IF DISCHARGE DURING TESTING OF THE WATER DISTRIBUTION SYSTEM.
G. SHOULD PERMANENT GRASSING REQUIREMENTS CONFLICT WITH LANDSCAPE PLANS, LANDSCAPE PLANS SUPERCEDE PERMANENT GRASSING REQUIREMENTS.

GRASSING SPECIFICATIONS:

A. ALL SEED MIXTURES FOR THE VARIOUS SEEDING SCHEDULES SHALL BE WEIGHED AND MIXED TO THE PROPER PROPORTIONS IN THE PRESENCE OF THE OWNER OR THE OWNER'S REPRESENTATIVE.
B. SCHEDULE NO. 1

COMMON NAME OF SEED	RATE (lbs/ac)	Optimum Dates to Plant
FESCUE	20	August 15-October
HULLED BERMUDA	4-6	April - July 15
PENSACOLA BAHIA	30	March 20 - June 15
SERICEA LESPEDEZA (CLAY SOILS)	40	April - June
WEEPING LOVE GRASS (SANDY SOILS)	2	April - July 20

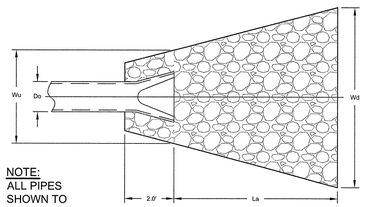
C. SCHEDULE NO. 2

COMMON NAME OF SEED	RATE (lbs/ac)	Optimum Dates to Plant
SWITCHGRASS	10	Febuary 10 - April 20
INDIAN GRASS	8	February - April 20
LITTLE BLUESTEM	8	February 10 - April

D. UTILIZE RATE A ON SLOPES OVER 5:1 VERTICAL IN HEIGHT BUT LESS THAN 3:1, AND USE RATE B LBS. PER 1000 SQ. FT. ON SLOPES LESS THAN 5:1 VERTICAL.
E. DOUBLE SEED (RATE A) ALL GRASSED SWALES , WATER WAYS, AND EMBANKMENTS FROM TOP OF BANK TO BOTTOM OF BANK ON ALL BANK SLOPES LESS THAN 3:1.
F. PROVIDE DOLOMITIC LIMESTONE AT 1 TON PER ACRE AND 16-4-12 FERTILIZER, AT 0.5-TON PER ACRE AND 12-4-8 FERTILIZER , AT 0.5 TON PER ACRE.

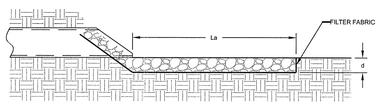
RIP RAP OUTLET PROTECTION SIZING

OUTLET	OUTLET PIPE DIAMETER, D_0 (INCHES)	25 YEAR STORM OUTFLOW (CFS)	APRON LENGTH, L_a (FEET)	AVERAGE ROCK DIAMETER, d_{50} (FEET)	UPSTREAM PROTECTION WIDTH, W_u (FEET)	DOWNSTREAM PROTECTION WIDTH, W_d (FEET)
1	15	2.73	8	0.5	4	12
2	12	1.56	6	0.5	3	9
3	12	2.10	6	0.5	3	9
4	12	2.88	6	0.5	3	9



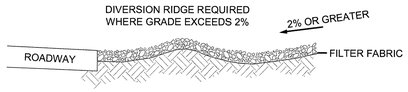
NOTE:
ALL PIPES SHOWN TO HAVE FLARED END SECTIONS

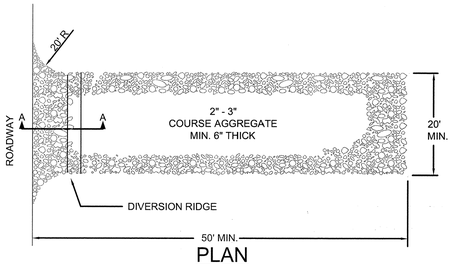
SINGLE OUTLET PIPE



PROFILE VIEW

RIP RAP OUTLET PROTECTION DETAIL
NOT TO SCALE





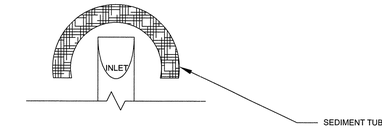
PLAN
NOT TO SCALE

CONSTRUCTION ENTRANCE/EXIT DETAIL

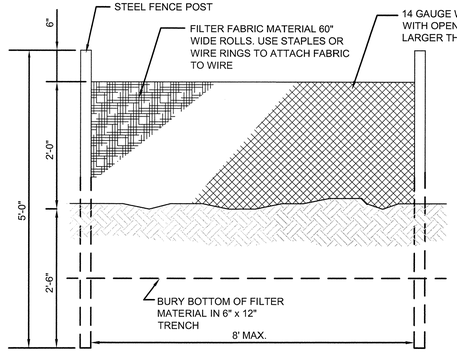
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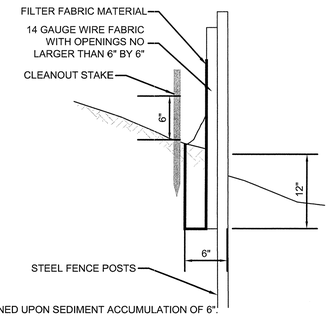
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
4. ROCK BAGS OR SANDBAGS SHALL BE PLACED SUCH THAT NO GAPS ARE EVIDENT.

STABILIZED CONSTRUCTION ENTRANCE INSPECTION AND MAINTENANCE:
INSPECT CONSTRUCTION ENTRANCES EVERY SEVEN (7) CALENDAR DAYS. CHECK FOR MUD AND SEDIMENT BUILDUP AND PAD INTEGRITY. MAKE DAILY INSPECTIONS DURING PERIODS OF WET WEATHER. MAINTENANCE IS REQUIRED MORE FREQUENTLY IN WET WEATHER CONDITIONS. RESHAPE THE STONE PAD AS NEEDED FOR DRAINAGE AND RUNOFF CONTROL.
WASH OR REPLACE STONES AS NEEDED AND AS DIRECTED BY THE INSPECTOR. THE STONE IN THE ENTRANCE SHOULD BE WASHED OR REPLACED WHENEVER THE ENTRANCE FAILS TO REDUCE MUD BEING CARRIED OFF-SITE BY VEHICLES. FREQUENT WASHING WILL EXTEND THE USEFUL LIFE OF STONE. IMMEDIATELY REMOVE MUD AND SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROADS BY BRUSHING OR SWEEPING. FLUSHING SHOULD ONLY BE USED WHEN THE WATER CAN BE DISCHARGED TO A SEDIMENT TRAP OR BASIN.
REPAIR ANY BROKEN PAVEMENT IMMEDIATELY.
INSPECT AND CLEAN SEDIMENT TRAPS IMMEDIATELY FOLLOWING EACH RAINFALL.
DISPOSE OF SEDIMENT IN A SUITABLE AREA IN SUCH A MANNER THAT IT WILL NOT ERODE.
REMOVE AS SOON AS THEY ARE NO LONGER NEEDED TO PROVIDE ACCESS TO THE SITE. BRING THE DISTURBED AREA TO GRADE, AND STABILIZE IT USING APPROPRIATE PERMANENT STABILIZATION METHODS.



OPEN END PIPE INLET PROTECTION DETAIL
NOT TO SCALE





NOTE: SILT FENCE TO HAVE CLEANOUT STAKES PLACED EVERY 50 FEET AND TO BE CLEANED UPON SEDIMENT ACCUMULATION OF 6".

SILT FENCE
NOT TO SCALE

SILT FENCE INSTALLATION AND MAINTENANCE
EXCAVATE A TRENCH APPROXIMATELY 6-INCHES WIDE AND 6-INCHES DEEP WHEN PLACING FABRIC BY HAND. PLACE 12-INCHES OF GEOTEXTILE FABRIC INTO THE 6-INCH DEEP TRENCH, EXTENDING THE REMAINING 6-INCHES TOWARDS THE UPSLOPE SIDE OF THE TRENCH. BACKFILL THE TRENCH WITH SOIL OR GRAVEL AND COMPACT. BURY 12-INCHES OF FABRIC INTO THE GROUND WHEN PNEUMATICALLY INSTALLING SILT FENCE WITH A SLICING METHOD. PURCHASE FABRIC IN CONTINUOUS ROLLS AND CUT TO THE LENGTH OF THE BARRIER TO AVOID JOINTS. WHEN JOINTS ARE NECESSARY, WRAP THE FABRIC TOGETHER AT A SUPPORT POST WITH BOTH ENDS FASTENED TO THE POST, WITH A 6-INCH MINIMUM OVERLAP.
INSTALL POSTS TO A MINIMUM DEPTH OF 24-INCHES. INSTALL POSTS A MINIMUM OF 1- TO 2- INCHES ABOVE THE FABRIC, WITH NO MORE THAN 3-FEET OF THE POST ABOVE THE GROUND. SPACE POSTS TO MAXIMUM 6-FEET CENTERS. ATTACH FABRIC TO WOOD POSTS USING STAPLES MADE OF HEAVY-DUTY WIRE AT LEAST 1½-INCH LONG, SPACED A MAXIMUM OF 6-INCHES APART. STAPLE A 2-INCH WIDE LATHE OVER THE FILTER FABRIC TO SECURELY FASTEN IT TO THE UPSLOPE SIDE OF WOODEN POSTS. ATTACH FABRIC TO THE STEEL POSTS USING HEAVY-DUTY PLASTIC TIES THAT ARE EVENLY SPACED AND PLACED IN A MANNER TO PREVENT SAGGING OR TEARING OF THE FABRIC. IN ALL CASES, TIES SHOULD BE AFFIXED IN NO LESS THAN 4 PLACES. INSTALL THE FABRIC A MINIMUM OF 24-INCHES ABOVE THE GROUND. WHEN NECESSARY, THE HEIGHT OF THE FENCE ABOVE GROUND MAY BE GREATER THAN 24-INCHES. IN TIDAL AREAS, EXTRA SILT FENCE HEIGHT MAY BE REQUIRED. THE POST HEIGHT WILL BE TWICE THE EXPOSED POST HEIGHT. POST SPACING WILL REMAIN THE SAME AND EXTRA HEIGHT FABRIC WILL BE 4-, 5-, OR 6- FEET TALL. LOCATE SILT FENCE CHECKS EVERY 100 FEET MAXIMUM AND AT LOW POINTS. INSTALL THE FENCE PERPENDICULAR TO THE DIRECTION OF FLOW AND PLACE THE FENCE THE PROPER DISTANCE FROM THE TOE OF STEEP SLOPES TO PROVIDE SEDIMENT STORAGE AND ACCESS FOR MAINTENANCE AND CLEANOUT.
INSPECT EVERY SEVEN CALENDAR DAYS. CHECK FOR SEDIMENT BUILDUP AND FENCE INTEGRITY. CHECK WHERE RUNOFF HAS ERODED A CHANNEL BENEATH THE FENCE, OR WHERE THE FENCE HAS SAGGED OR COLLAPSED BY FENCE OVERTOPPING.
IF THE FENCE FABRIC TEARS, BEGINS TO DECOMPOSE, OR IN ANY WAY BECOMES INEFFECTIVE, REPLACE THE SECTION OF FENCE IMMEDIATELY.
REMOVE SEDIMENT ACCUMULATED ALONG THE FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE, ESPECIALLY IF HEAVY RAINS ARE EXPECTED.
REMOVE TRAPPED SEDIMENT FROM THE SITE OR STABILIZE IT ON SITE.
REMOVE SILT FENCE WITHIN 30 DAYS AFTER FINAL STABILIZATION IS ACHIEVED OR AFTER TEMPORARY BEST MANAGEMENT PRACTICES (BMPS) ARE NO LONGER NEEDED.
PERMANENTLY STABILIZE DISTURBED AREAS RESULTING FROM FENCE REMOVAL.

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REVISION	DATE

APPROVALS: ENGINEER KMC | DESIGNER JAM | DRAFTSMAN SNA | CHECKED BY BSW | APPROVED KMC

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SHEET: EROSION AND SEDIMENT CONTROL DETAILS (SHEET 2 OF 2) | SCALE: N.T.S. | DATE: JANUARY 2015

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA | FLORENCE COUNTY | SOUTH CAROLINA

FILE NAME:	SHEET
C10.DWG	C10
REFERENCE FILE: 15103 BASE.DWG	OF C10
PROJECT NO. 15103-0021	

DWG NO. 01,896-D16

ELECTRICAL SYMBOL SCHEDULE

SYMBOL	DESCRIPTION
LP1–2,4	BRANCH CIRCUIT RACEWAY. RUN CONCEALED IN CEILING OR WALLS. ARROWHEAD DENOTES HOMERUN TO PANEL. CROSSLINES DENOTE NUMBER OF PHASE AND NEUTRAL CONDUCTORS WHEN MORE THAN TWO ARE TO BE INSTALLED. TEXT DENOTES PANEL NAME AND CIRCUIT NUMBERS FOR HOMERUN. INSTALL GROUND WIRE IN ALL RACEWAYS. #12 AWG MINIMUM AND AS PER CODE.
LP1–2,4	BRANCH CIRCUIT RACEWAY. RUN IN OR UNDER SLAB OR FLOOR. ARROWHEAD DENOTES HOMERUN TO PANEL. CROSSLINES DENOTE NUMBER OF PHASE AND NEUTRAL CONDUCTORS WHEN MORE THAN TWO ARE TO BE INSTALLED. TEXT DENOTES PANEL NAME AND CIRCUIT NUMBERS FOR HOMERUN. INSTALL GROUND WIRE IN ALL RACEWAYS. #12 AWG MINIMUM AND AS PER CODE.
▬	ELECTRICAL CIRCUIT BREAKER PANELBOARD. SEE PANEL SCHEDULES.
□	HEAVY DUTY DISCONNECT SWITCH, SEE SCHEDULE.
	120V, 20A DUPLEX RECEPTACLE, NEMA 5–20R. WALL MOUNTED, REFER TO TYPICAL MOUNTING HEIGHTS DETAIL. REFER TO ADDITIONAL NOTATIONS BELOW WHERE INDICATED ON DRAWINGS.
GF WP	GROUND FAULT CIRCUIT INTERRUPTER TYPE WITH CAST (METALLIC) WEATHERPROOF IN–USE TYPE COVER. ALL RECEPTACLES LOCATED OUTDOORS OR EXPOSED TO THE ELEMENTS SHALL BE WEATHER RESISTANT LISTED WITH "WR" LISTING ON FACE OF DEVICE BY FACTORY.

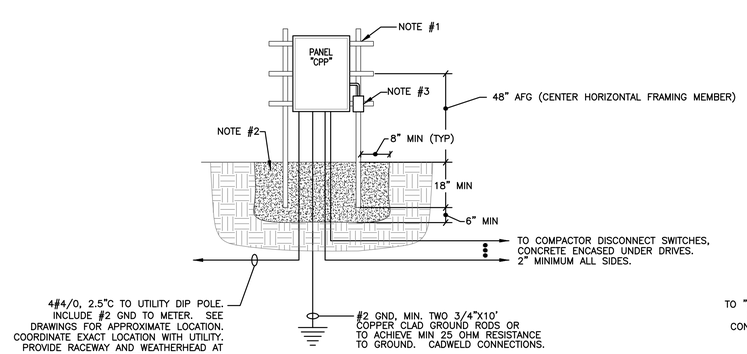
	ABBREVIATIONS
A	AMPERE.
AFF	ABOVE FINISHED FLOOR.
AFG	ABOVE FINISHED GRADE.
BKR	BREAKER.
C	CONDUIT.
CATV	CABLE TELEVISION
CKT	CIRCUIT.
EC	ELECTRICAL CONTRACTOR, DIVISION 16 (DIV 16).
EF	EXHAUST FAN.
EMT	ELECTRICAL METALLIC TUBING.
FCU	FAN COIL UNIT.
GC	GENERAL CONTRACTOR, DIVISION 00 THROUGH 14.
GF	GROUND FAULT CIRCUIT INTERRUPTER.
GRS	GALVANIZED RIGID STEEL CONDUIT.
HID	HIGH INTENSITY DISCHARGE.
IG	DEVICE SHALL HAVE ISOLATED GROUND. SEE SPECIFICATIONS.
IMC	INTERMEDIATE METALLIC CONDUIT.
JB or J–BOX	JUNCTION BOX.
KVA	KILOVOLT AMPERES.
KW	KILOWATT.
MAX	MAXIMUM.
MC	MECHANICAL CONTRACTOR, DIVISION 15 (DIV 15).
MDP	MAIN DISTRIBUTION PANEL.
MIN	MINIMUM.
MFR	MANUFACTURER.
NMC	NONMETALLIC–SHEATHED CABLE
V	VOLT.
NEC	2011 NATIONAL ELECTRICAL CODE. (NFPA 70).
SWBD	SWITCHBOARD.
TYP	TYPICAL.
UNO	UNLESS NOTED OTHERWISE.
wc	WATER COOLER.
XFMR	TRANSFORMER.

NAME : PANEL "CPP" BUS AMPS : 225A SERVICE ENTRANCE EQUIPMENT
SYSTEM : NORMAL MAIN : 200A/3P MAIN CIRCUIT BREAKER
TYPE : SQUARE D, NQOD VOLTAGE : 120–240V/3ø/4W/SN
SHORT CKT RATING : 22K AIC MINIMUM MOUNTING : SURFACE, NEMA 3R

CKT.	CIRCUIT NAME	WIRE	COND	LOAD	BKR.	POLES	PHASE	POLES	BKR.	LOAD	COND	WIRE	CIRCUIT NAME	CKT.
1				3.9			A		20	0.2	1/2	12	RECEPTACLE AT PANEL	2
3	COMPACTOR	4	1.25	3.9	60		B						HIGH LEG SPACE	4
5				3.9			C		20	0.6	1	10	RECEPTACLES AT COMPACTORS	6
7				3.9			A						PREPARED SPACE	8
9	COMPACTOR	4	1.25	3.9	60		B						HIGH LEG SPACE	10
11				3.9			C						PREPARED SPACE	12
13				3.9			A						PREPARED SPACE	14
15	COMPACTOR	4	1.25	3.9	60		B						HIGH LEG SPACE	16
17				3.9			C						PREPARED SPACE	18
19	PREPARED SPACE						A						PREPARED SPACE	20
21	HIGH LEG SPACE						B						PREPARED SPACE	22
23	PREPARED SPACE						C						PREPARED SPACE	24
25	PREPARED SPACE						A						PREPARED SPACE	26
27	HIGH LEG SPACE						B						PREPARED SPACE	28
29	PREPARED SPACE						C						PREPARED SPACE	30

CONNECTED LOAD, (KVA): A 11.9 B 11.7 C 12.3

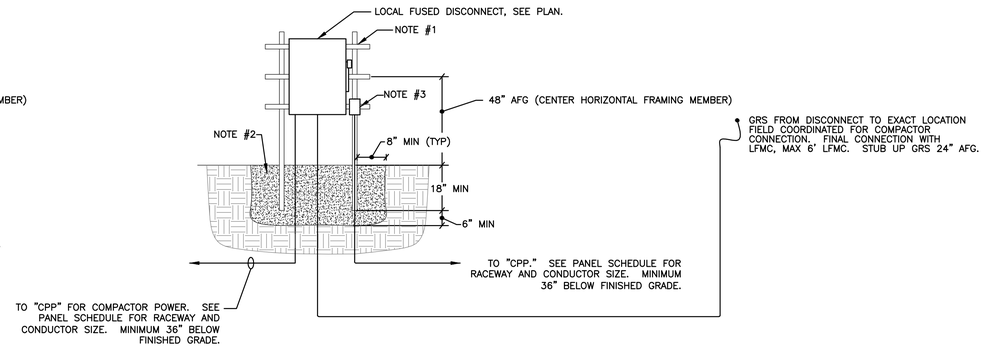
* VERIFY WITH OWNER PROVIDED EQUIPMENT REQUIREMENTS.
** OR AS REQUIRED BY EQUIPMENT BEING INSTALLED.
NOTE 1: THIS PANEL IS FED BY A HIGH LEG SERVICE. THE HIGH LEG IS ASSUMED TO BE PHASE B. VERIFY WITH UTILITY AND MARK ALL SINGLE POLE HIGH LEG SPACES ACCORDINGLY.
NOTE 2: VERIFY SHORT CIRCUIT CURRENT AT TRANSFORMER SECONDARY WITH UTILITY. ADJUST PANEL AIC RATING TO MATCH UTILITY AVAILABLE SHORT CIRCUIT CURRENT, RATING INDICATED IS MINIMUM. SUBMIT UTILITY INFORMATION WITH GEAR SHOP DRAWINGS.



POWER RISER DIAGRAM

NO SCALE

NOTE #1: PROVIDE MINIMUM 1 5/8" GALVANIZED CHANNEL STRUT FOR ALL RACK FRAMING AND SUPPORTS. USE GALVANIZED FASTENERS, STRAPS, FITTINGS, ETC ONLY. COAT ALL FIELD CUTS OF STRUT OR HARDWARE WITH COLD GALVANIZING SPRAY.
NOTE #2: 3000 PSI CONCRETE, MINIMUM 8" AROUND EACH RACK VERTICAL SUPPORTS.
NOTE #3: PROVIDE 120V, 20A HEAVY DUTY DUPLEX RECEPTACLE IN WEATHERPROOF BACKBOX WITH WEATHERPROOF COVER. 2#12, 1#12 GND, 1/2" RGS RACEWAY TO PANEL "CPP". JUNCTION BOX SHALL BE FS TYPE WITH THREADED HUBS.



COMPACTOR DISCONNECT DETAIL

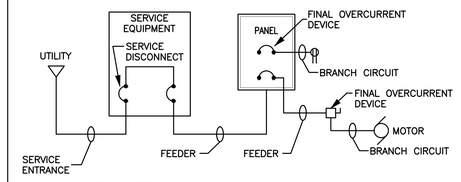
NO SCALE

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GENERAL NOTES:

1. DO NOT SCALE DRAWINGS. LOCATE OUTLETS, EQUIPMENT AND OTHER ELECTRICAL DEVICES AS INDICATED AND COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS. COORDINATE EXACT LIGHTING FIXTURE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLAN.
2. MINIMUM SIZE CONDUCTOR FOR POWER SHALL BE #12 AWG. MAXIMUM OF FOUR CURRENT CARRYING CONDUCTORS (THREE PHASE PLUS NEUTRAL) PER HOMERUN PLUS GROUND. PROVIDE DEDICATED NEUTRAL FOR EACH CIRCUIT OF A MULTIWIRE BRANCH CIRCUIT.
3. ALL FUSES SHALL BE DUAL–ELEMENT TYPE, "FUSETRON" BY BUSSMAN, "ECON" BY ECONOMY, OR FERRAZ SHAWMUT.
4. BRANCH CIRCUIT SIZES ARE #12 AWG, 1/2" C. UNLESS OTHERWISE NOTED IN PANELBOARD SCHEDULES.
5. ALL BRANCH CIRCUIT LOADS SHALL BE BALANCED ACROSS PANELBOARD BUSSES TO OBTAIN MINIMUM NEUTRAL CURRENT.
6. ALL FLEXIBLE CONDUIT SHALL CONTAIN A GREEN WIRE BONDED TO RIGID RACEWAY, BOX OR FIXTURE AT EACH END OF FLEX. SIZE GROUND PER NEC TABLE 250–122.
7. PROVIDE PULL STRING IN ALL EMPTY RACEWAYS.
8. COORDINATE WITH OTHER TRADES TO CONCEAL ELECTRICAL WORK AND PROVIDE OUTLETS IN CORRECT LOCATIONS.
9. WHERE NOT INDICATED OTHERWISE, EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED PER NEC TABE 250–122.
10. ALL CONDUITS 1" AND LARGER SHALL HAVE A GROUNDING BUSHING BONDING CONDUIT TO ENCLOSURE.
11. VERIFY ALL EQUIPMENT LOCATIONS AND ELECTRICAL REQUIREMENTS WITH CIVIL PLANS AND EQUIPMENT VENDOR. IF EQUIPMENT BEING PROVIDED DOES NOT MATCH DESIGN NOTIFY ENGINEER IMMEDIATELY.
12. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING WORK WITH POWER UTILITY. ELECTRICAL CONTRACTOR TO PROVIDE ALL MATERIALS AND WORK FOR AS REQUIRED BY EACH UTILITY FOR A COMPLETE AND OPERABLE SYSTEM. PROVIDE RACEWAY(S) TO UTILITY CONNECTION POINT.
13. ELECTRICAL WORK SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL CODES, REQUIREMENTS AND ORDINANCES.
14 COORDINATE ALL UTILITY DEMOLITION AND RELOCATION WORK WITH OWNER AND SERVICING UTILITY AS REQUIRED FOR WORK INDICATED ON ELECTRICAL AND CIVIL PLANS.
15. PROVIDE PERMANENT ENGRAVED NAME PLATES ON PANELBOARDS AND DISCONNECT SWITCHES. BLACK WITH WHITE LETTERING, LETTERING 3/8" HIGH. INDICATE PANEL NAME AND VOLTAGE ON PANEL, SOURCE AND CIRCUIT NUMBER ON DISCONNECT SWITCHES.
16. MAKE NEUTRAL GROUND BOND AT SERVICE ENTRANCE EQUIPMENT.

RACEWAY MATERIAL SCHEDULE



RACEWAY MATERIALS:

SERVICE ENTRANCE: GRS. GRS TO HAVE BITUMINOUS COATING IF INSTALLED BELOW GRADE.

FEEDERS: GRS

BRANCH CIRCUITS CONCEALED ABOVE CEILING/IN WALLS: EMT, IMC, GRS.

BRANCH CIRCUITS EXPOSED (INTERIOR): EMT

OUTDOORS BELOW GRADE: SAME AS SERVICE ENTRANCE.

OUTDOORS EXPOSED: GRS (WITH THE EXCEPTION OF CONNECTIONS TO MECHANICAL EQUIPMENT WHICH MAY BE FLEXIBLE WATERTIGHT CONDUIT LMFC).

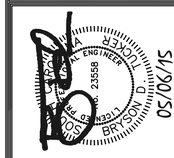
DISCONNECT SWITCH SCHEDULE	
SWITCH	DESCRIPTION
S–1	30A/2P
S–2	60A/2P
S–3	100A/2P
S–4	200A/2P
S–5	400A/2P
S–6	30A/3P
S–7	60A/3P
S–8	100A/3P
S–9	200A/3P
S–10	400A/3P
S–11	30A/4WSN
S–12	60A/4WSN
S–13	100A/4WSN
S–14	200A/4WSN
S–15	400A/4WSN

SWITCH NOTES:

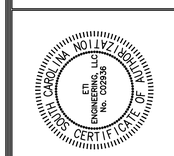
1. ALL DISCONNECTS SHALL BE HEAVY DUTY TYPE.
2. 240V OR 600V TO SUIT CIRCUIT VOLTAGE.
3. ALL DISCONNECTS FUSIBLE UNLESS OTHERWISE NOTED, PROVIDE FUSES TO SUIT LOAD.
4. ENCLOSURES NEMA 3R OUTDOORS AND IN WET LOCATIONS, NEMA 1 ELSEWHERE UNLESS OTHERWISE NOTED.

REVISION	DATE

APPROVALS	
ENGINEER	BDT
DESIGNER	BDT
TECHNICIAN	BDT
CHECKED BY	BDT
APPROVED	BDT



DATE:



SIGNATURE:

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SHEET: ELECTRICAL SCHEDULES, DETAILS, NOTES AND RISERS
DATE: MAY 6, 2015

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA
FLORENCE COUNTY SOUTH CAROLINA

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FILE NAME:
REFERENCE FILE:
PROJECT NO. 15103–0021
SHEET 1 OF 3
DWG NO. E000

ELECTRICAL SPECIFICATIONS

1. GENERAL PROVISIONS

A. Work included in these specifications and included on the drawings shall include furnishing all labor, materials, supplies, and equipment to perform all work required including cutting, channeling, chasing, excavating and backfilling, to install a complete and working electrical system(s) in accordance with these sections of the specifications and the accompanying drawings. This shall include all required preparation work, raceways, coordination, etc. required to install the electrical system.

B. The electrical work shall include, but in no way be limited to the following:
1. Raceways (To include raceways for conductors and cables, but also empty for designated signal systems and future uses.)
2. Electrical Distribution System.
3. Exterior Power Systems.
4. Wiring Devices.
5. Connection and installation of Equipment Furnished Under Other Divisions of the Specification.
6. Utility Service Entrances – Electrical.

C. The contractor is responsible for including any and all work related to the electrical that is noted in any part of the specifications or any part of the drawings, including Divisions 1, 15 and any other sections. The contractor will supply power to equipment at the voltage indicated on the drawings. The contractor will be held responsible for coordinating the equipment voltages, control equipment, wiring, and locations and type of terminations/connections and/or disconnects required to comply with the National Electrical Code, International Building Code, International Energy Conservation Code, all local codes, and the equipment manufacturer's requirements.

D. Electrical Drawings are diagrammatic in nature except where specific dimensions, or specific details are shown on the electrical or civil drawings. The contractor shall refer to other drawings for exact locations of equipment, building dimensions, civil details and conditions affecting the electrical work; however, field measurements take precedence over dimensioned drawings. The Electrical Contractor shall provide all labor and materials and all incidental elements; junction and pull boxes, filters, pull wires, connectors, support materials, fuses, disconnect switches, lamps, and labels, to install, connect, start-up and result in a complete and working system in accordance with the drawings and specifications. The contractor is responsible for coordinating the installation of all electrical work with the work of other contractors and/or trades. The electrical drawings are such that the electrical service to equipment furnished and installed under other sections of the contract documents (examples, include but are not limited to: HVAC equipment, water heaters, fans, pumps, motors, etc) is coordinated for the specified equipment only. If the equipment installed under other divisions of the contract documents is not the specified equipment it is the responsibility of the contractor to coordinate the electrical service/interface requirements with the electrical contractor.

E. Provide all wiring, connectors, fittings, connections, and all accessories for the complete installation of, and final connections to, equipment furnished under other divisions of the specifications and where indicated on the drawings or otherwise specified.

F. All safety disconnect switches shall be provided under Division 16 unless specifically noted on drawings. The electrical contractor shall furnish and install fuses that are sized in accordance to the equipment nameplate of the equipment served.

G. The contractor is responsible for obtaining all required permits and complying with all National (NEC, IBC, NFPA), State, County, and Municipal codes and regulations. This shall include, but not be limited to, the following:
1. Federal Occupational Safety and Health Act (OSHA)
2. NFPA 70 (National Electrical Code)
3. NFPA 101 (Life Safety Code)
4. Americans with Disabilities Act (ADA).
5. International Building Code (IBC).
8. International Energy Conservation Code (IECC).

H. The contractor shall keep a set of construction drawings during the length of the project on which he shall note any and all changes from the original drawings. This record set of drawings shall be updated daily.

I. Electrical Subcontractor shall submit for review by the Engineer detailed shop drawings of all material listed below. All submittal data shall be submitted at one time. No material or equipment for which Engineer's review is required shall be delivered to the job site or installed until the Electrical Contractor has in his possession the reviewed and approved shop drawings for the particular material and/or equipment. The Electrical Contractor shall assemble, organize, prepare and review for correctness shop drawings on all materials, equipment, fixtures and devices to be used. The Electrical contractor shall furnish the number of copies specified by the Civil Engineer or one pdf copy of shop drawings if no number is specified by the Civil Engineer. Shop drawings that are incorrectly submitted, contain errors or omissions, or not in the form and sequence specified shall be rejected as unapproved.

Review of shop drawings in no way relieves the Contractor of his responsibility of quantity, dimensions, weights, means and methods, safety, or coordination with others.

Failure of the Contractor to submit shop drawings to the Engineer with reasonable time for review shall not entitle the Contractor to an extension of contract time. Reasonable review time is fifteen working days unless otherwise specified.

At minimum shop drawings shall be submitted for

1. Panelboards
2. Safety switches
3. Basic materials; wire, conduit, fittings, wiring devices

J. Requests for Substitution

Submit requests for substitution to Engineer by US Mail or Courier no fewer than ten (10) working days prior to bid time. Requests shall contain cutsheets, catalog numbers, etc. Any approval will be in writing by the Engineer.

Substituted items will not result in an increase in cost to the Owner.

K. Catalog numbers and names that appear in the specifications or on the plans may be incomplete or obsolete and are for descriptive purposes only. As such they may not indicate all of the parts, pieces and systems required for a complete and operating installation. It is the responsibility of the Electrical Contractor, the Vendor and the Supplier to review the plans, specifications and applications to determine the correct item(s) required to include all installation and support materials and systems for a complete and working installation.

2. RACEWAYS/CONDUITS AND ASSOCIATED EQUIPMENT

A. The work shall include all raceways, conduits, fittings, and all other equipment required to install a raceway system. This shall include, but not limited to the following:
1. Rigid metal conduit and fittings (GRS).
2. Electrical metallic tubing and fittings (EMT).
3. Flexible metal conduit and fittings.
4. Liquid tight flexible metal conduit and fittings (LMFC).
5. Non-metallic conduit and fittings.

B. Except where otherwise permitted on drawings route all conductors in conduit.

C. All signal systems shall have their wiring installed in conduit/raceways to above accessible ceiling. All cabling exposed above ceiling shall be plenum rated.

Conduit routing and device wiring for signal system components is not shown on the drawings. The contractor shall coordinate with the signal system manufacturer to determine the conduit (size and routing) and wiring requirements to circuit the equipment shown on the drawings.

D. Specified products and their areas of use shall be as described on drawings.

E. Fittings shall be steel compression type, concrete tight for all EMT raceways. For PVC raceways, use slip fittings with glue joints. For rigid galvanized steel and IMC, fittings shall be threaded galvanized iron, heavy steel, concrete tight.

F. Size conduit for conductor type installed; 3/4 inch minimum size.

G. For all empty raceways, furnish and install a nylon pull cord. The nylon pull cord shall be rated for a 200 pound force pull strength.

3. WIRE AND CABLE – 600 VOLTS AND LESS

A. Work shall include the furnishing and installing of all required wire and cable to complete the wiring and electrical system. This shall include, but not be limited to the following:
1. Building wire.
2. Wiring connections and terminations.
3. Communications cabling as specified on drawings.

B. All service entrance power cable shall be type THWN OR RHW, 90 degree C, copper conductor U.N.O. Feeders and Branch Circuits Larger Than 6 AWG: Copper, stranded conductor, 600 volt insulation, THHN. Feeders and Branch Circuits 6 AWG and Smaller: Copper conductor, 600 volt insulation, THHN. 6 and 8 AWG, stranded conductor; smaller than 8 AWG, solid conductor. MINIMUM SIZE SHALL BE #12 FOR ALL WIRING ABOVE 48 VOLTS.

C. All cables shall be color coded. Color coding shall be as follows:

120/240 Volt	Phase
Black	A
Red with Orange	B (high leg)
Blue	C
White	Neutral
Green	Ground

D. Each wire or cable in a feeder at its terminal points, and in each pull-box, junction box, and panel gutter through which it passes shall be identified to show the circuit number of the breaker that it connects to. Each common wire, common circuit to common loop of a system, sound system, or any signal system conductor, shall be identified.

E. All installation shall be in accordance with the NEC. All splices shall be in junction boxes and shall be electrically and mechanically secure. Where a circuit home run is shown on the plans without any conductor or raceway identification, it shall be a minimum of 2 # 12, 1 # 12 Ground, 1/2" Conduit. Place an equal number of conductors for each phase of a circuit in same raceway or cable. Splice only in junction or outlet boxes. Neatly train and lace wiring inside boxes, equipment, and panelboards. Perform continuity test on all power and equipment branch circuit conductors. Verify proper phasing connections.

4. PANELBOARDS

A. This section includes furnishing and installing panelboards and related equipment to form a complete and functioning electrical system. This shall include, but not be limited to the following:
1. Service and distribution panelboards.
2. Lighting and appliance branch circuit panel.

B. Panelboards shall be as manufactured by Square D or equivalent by Cutler Hammer or Siemens.

C. Provide cabinet front with concealed trim clamps, and hinged door with flush lock. Finish in manufacturer's standard gray enamel. Provide panelboards with copper bus, ratings as scheduled. Provide copper ground bus in all panelboards. Minimum Integrated Short Circuit Rating: See drawings. Molded Case Circuit Breakers: NEMA AB 1; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits. All breakers shall be bolt on type.

D. Furnish and install all required materials to install and mount the panelboards to the wall shown on the drawings. Install panelboards plumb and flush with wall finishes, in conformance with NEMA PB 1.1. Provide filler plates for unused spaces in panelboards.

E. Provide typed circuit directory for each circuit breaker in each panelboard. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses. Provide name plates for each panel and switch as described in the General Notes on the drawings.

5. WIRING DEVICES

A. The shall include the furnishing and installing of any and all wiring devices required to make a complete and functioning wiring system. See the drawings for symbols and descriptions of devices. Devices specified are to establish a level of quality. All devices shall be best specification grade. Equivalent devices by Pass and Seymore or Leviton are acceptable.

Color of devices shall be gray

B. Ground Fault receptacle shall be HBL #5362SG.

C. Installation shall be per NEC. Include ground wire and connection with all receptacle circuits. Install convenience receptacles grounding pole on top. Install devices level. GFCI receptacles shall not be used to protect non-GFCI receptacles.

6. SECONDARY GROUNDING

A. Work included shall include power system grounding, communication system grounding, and electrical equipment and raceway grounding and bonding. Ground electrical work in accordance with NEC Article 250, local codes as specified herein, and as shown on the drawings.

B. Ground the electrical service system neutral at service entrance equipment to supplementary grounding electrode(s). Provide communications system grounding conductor at point of service entrance. Bond together system neutrals, service equipment enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.

C. Provide a grounding system that includes all connections and testing of: ground rods, ground cables, ground buses, conduits, fittings, anchors, supports, CADWELD(R) materials and equipment, and other materials as required for a complete installation. Provide ground cables composed of soft drawn, stranded bare copper of 98 percent conductivity encased in nonmetallic conduit above grade. Cable to be buried not less than 24 inches below grade. Install as required to provide sufficient mechanical protection. All copper to copper and copper to steel connections of #6 AWG and larger shall be made with the CADWELD(R).

D. Ground Rods: Copper-encased steel, 3/4 inch diameter, minimum length 10 feet. Number as required to achieve 25 ohms maximum.

E. Provide a separate, insulated equipment grounding conductor in feeder and branch circuits. Terminate each end on a grounding lug, bus, or bushing. Connect grounding electrode conductors to metal water pipe using a suitable ground clamp. Make connections to flanged piping at street side of flange. Provide bonding jumper around water meter. Supplementary Grounding Electrode: Use driven ground rods on exterior of building.

F. Install ground cables continuous between connections. Splices will not be allowed except where indicated on the drawings. Connections made by the CADWELD(R) Process are not considered splices. Where ground cables pass through floor slabs, building walls, etc., and are not in metallic enclosures, provide the sleeves of approved nonmetallic material.

G. Install equipment grounding conductors in raceway with feeder and branch circuit conductors. Flexible metal conduit shall have a ground wire installed with the power conductors. Where connections are made to motors or equipment with flexible metal conduit, grounding conductor shall be stranded copper conductor within the conduit, bonded to the equipment and to the rigid metal raceway system. At each convenience outlet, install a grounding clip attached to the outlet box and leave a sufficient length of #12 wire with green colored insulation to connect to the grounding terminal of the receptacle.

7. TESTING

A. GUARANTEE OF WORK, EQUIPMENT AND MATERIALS
1. The complete system shall be free of faults, short circuits, grounds and open circuits. Balance loads across phases to obtain minimum neutral current in feeders and branch circuits.
2. The Electrical Contractor shall perform inspections and test as herein specified. The Electrical Contractor shall provide all material, equipment, labor and supervision to perform such tests and inspections.
3. It is the intent of these tests to assure that all tested electrical equipment and systems are operational and within industry and the manufacturer's tolerances and is installed in accordance with the design Specifications. The test and inspections shall determine suitability for energization.
Written documentation of the tests and inspections shall be provided and shall include the company name performing the work, project name, date and time of tests, weather and humidity

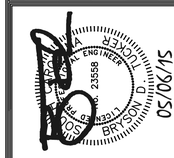
B. Systems and equipment are to be tested and operated to verify compliance with the requirements of the contract documents and applicable codes.
Equipment, systems, conductors and devices to be tested are as follows:
1. Power Distribution Equipment shown on the one-line (Power Riser) diagram.
a. Proper torque values on lugs and connectors.
b. Proper operation of equipment ground fault protective devices.
2. Conductors - Conductors rated 100 amperes and above and all conductors installed below grade.
a. Proper conductor and insulation type
b. Insulation resistance test (Megger) at 1000 volts DC for 1 Minute or per cable manufacturer specifications.
c. Minimum insulation resistance values shall not be less than fifty (50) megohms.

C. Grounding
1. Test ground resistance using the attached rod technique (ART) or the fall of potential method according to IEEE 81 at the service entrance.
2. Verify proper type and size of grounding conductors and proper ground connections.
3. If ground resistance exceeds 25 ohms or values otherwise specified in the Specifications, equipment requirements or General or Special Conditions notify the Engineer immediately. The Electrical Contractor shall be responsible for providing alternate and/or additional means of grounding to reduce the ground resistance to 25 ohms or below at no additional cost.

D. Grounding and Ground Fault Personnel Protection
a. Test ground fault receptacles and ground fault branch circuit breakers.
b. Test ten (10) percent of all 120 volt receptacle outlets for proper wiring.

REVISION	DATE

APPROVALS	ENGINEER	DESIGNER	TECHNICIAN	CHECKED BY	APPROVED
	BDT	BDT	BDT	BDT	BDT



DATE: 05/06/15



SIGNATURE:

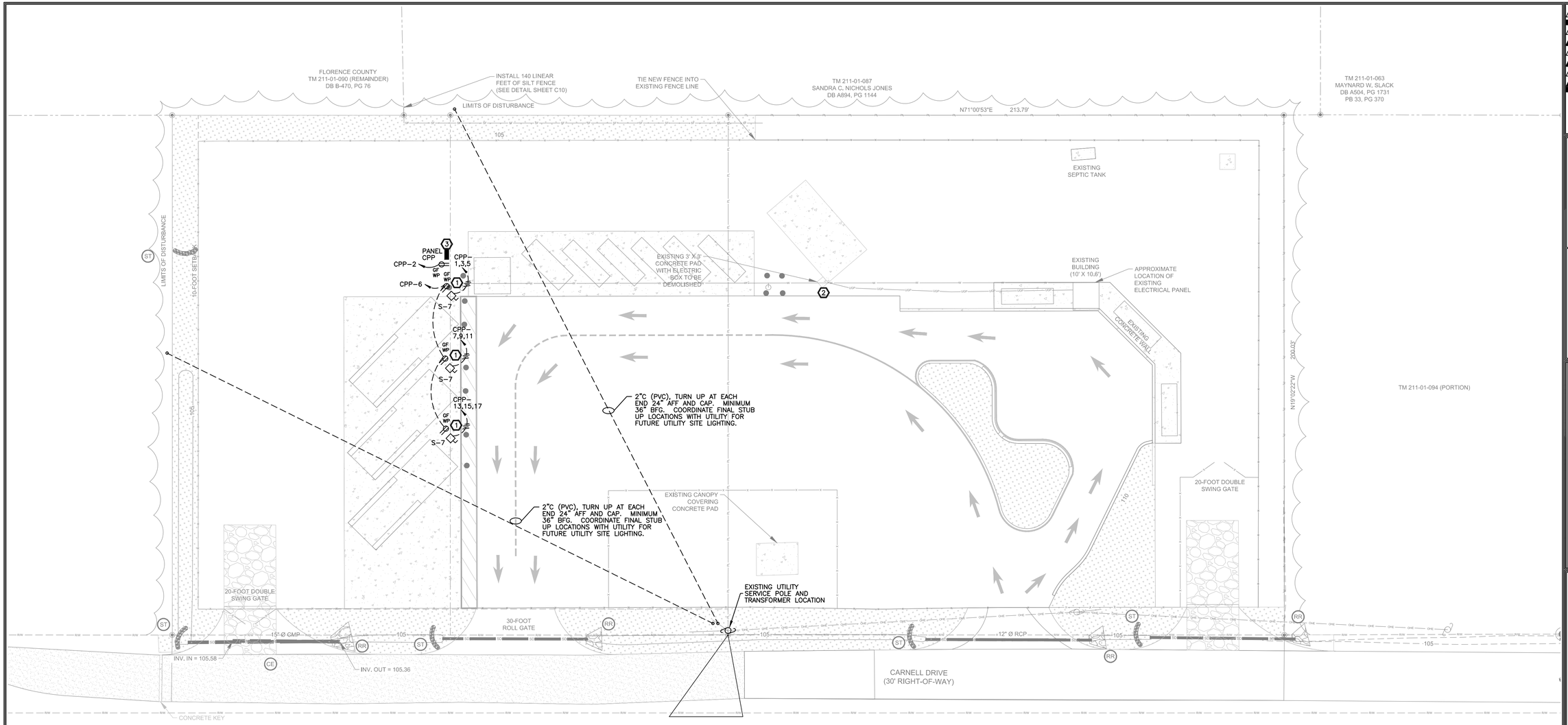
ALLIANCE CONSULTING ENGINEERS
Alliance Consulting Engineers, Inc.
Post Office Box 8147 Columbia, South Carolina 29202-8147
Phone (803) 779-2078 • Fax (803) 779-2079

SHEET ELECTRICAL SPECIFICATIONS DATE: MAY 6, 2015

PROJECT
SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA
FLORENCE COUNTY SOUTH CAROLINA

eti
ENGINEERING, LLC
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ETI #1504-16624

FILE NAME:
REFERENCE FILE:
PROJECT NO. 15103-0021
SHEET 2 OF 3
DWG NO. E001



1 ELECTRICAL WIRING PLAN

APPROX SCALE: 1" = 20'-0"

NOTES KEYED TO THIS PLAN:

1. COORDINATE MOUNTING LOCATION OF SWITCH AND CONVENIENCE RECEPTACLE WITH EQUIPMENT VENDOR. CONNECT SWITCH COMPLETE TO EQUIPMENT. SEE DETAIL.
2. DEMOLISH EXISTING ELECTRICAL CONNECTION TO EXISTING COMPACTOR. DEMOLISH CONDUCTORS AND RACEWAY BACK TO EXISTING PANEL. TURN OFF EXISTING CIRCUIT BREAKER SERVING COMPACTOR AND LABEL AS SPARE.
3. NEW SERVICE ENTRANCE PANELBOARD. SEE RISER DETAIL.

REVISION DATE

APPROVALS	
ENGINEER	BDT
DESIGNER	BDT
TECHNICIAN	BDT
CHECKED BY	BDT
APPROVED	BDT

DATE: 05/06/15

SIGNATURE:

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SHEET: ELECTRICAL WIRING PLAN

DATE: MAY 6, 2015

PROJECT: SITE IMPROVEMENTS FOR THE GREENWOOD CONVENIENCE CENTER IN FLORENCE COUNTY, SOUTH CAROLINA

FLORENCE COUNTY SOUTH CAROLINA

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SHEET 3 OF 3

DWG NO. E100