

PROJECT MANUAL
FOR
ROADWAY IMPROVEMENTS TO
MOUNTAIN LAUREL DRIVE
AIKEN COUNTY, SOUTH CAROLINA



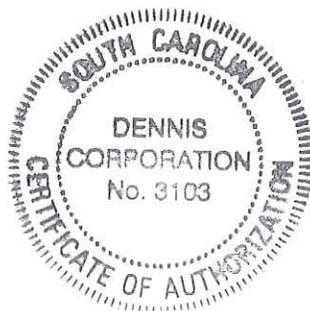
RFB # _____

DATE: _____

ENGINEER:



1800 Huger Street
Columbia, SC 29201
803-252-0991 (o)
803-733-6787 (f)



SET NO. _____

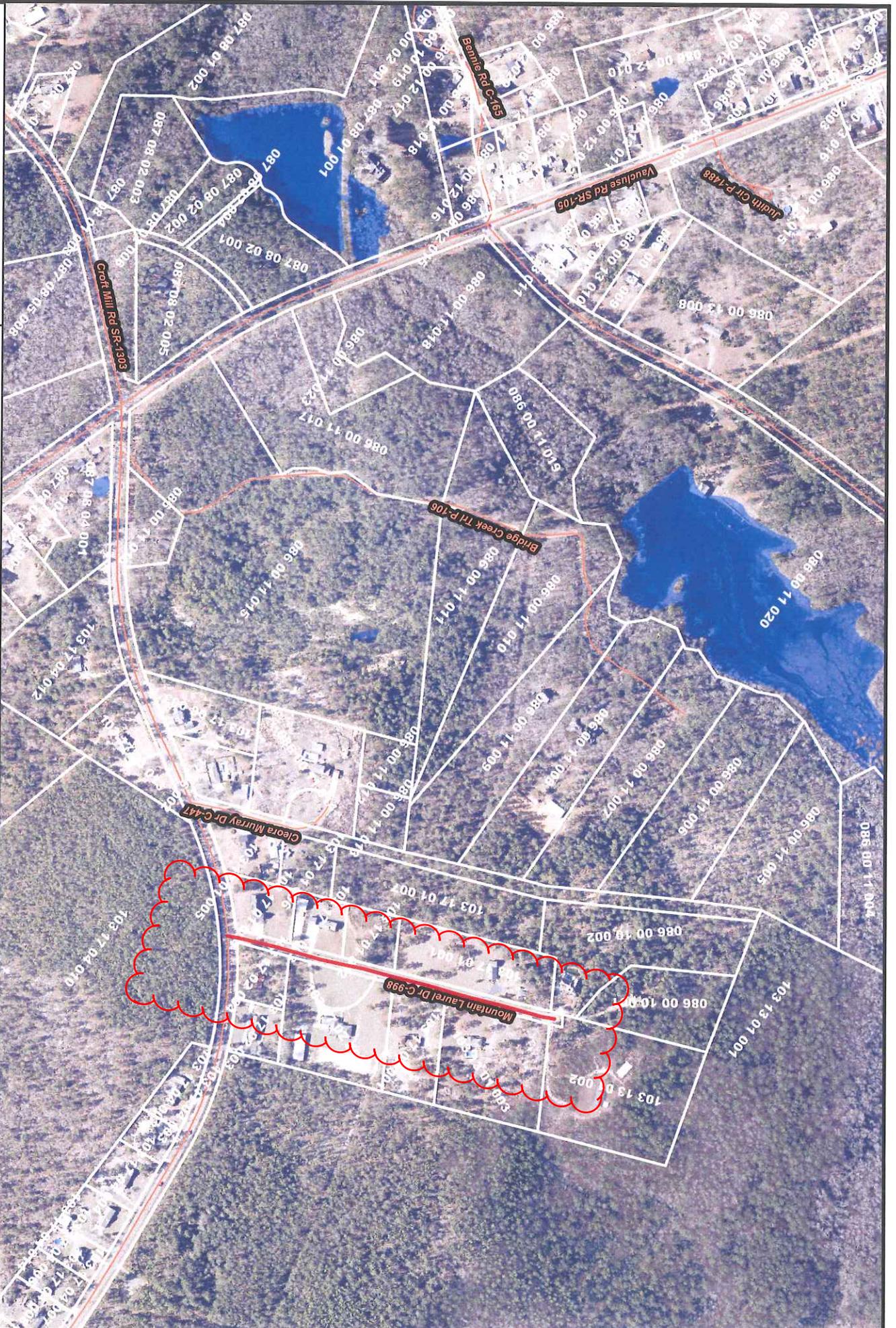
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Mountain Laurel Drive (C-998)**

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SPECIFICATION REFERENCES

The "Standard Specifications for Highway Construction, Edition of 2007" as published by the South Carolina Department of Transportation shall govern the material and workmanship on this project and is incorporated within this Contract by reference, except where modified by the Specifications and the Special Provisions included within this section. In addition, the "Standard Drawings for Road Construction" published by the South Carolina Department of Transportation are incorporated within this Contract by reference.



Aiken County Engineering
 1930 University Parkway
 Aiken, SC 29801
 803-642-1535
 Fax: 803-642-3684
 8/24/2015 S.Redick




Mountain Laurel Dr C-998

Scale: 1 inch = 500 feet

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AIKEN COUNTY GOVERNMENT
ROADWAY IMPROVEMENTS TO MOUNTAIN LAUREL DRIVE

INVITATION TO BID

PROJECT DESCRIPTION: Aiken County Government is requesting Sealed Bids to improve approximately 1,300 LF of Mountain Laurel Drive, an existing dirt road located in Aiken County, SC, just outside of the City of Aiken. Improvements to be performed include grading and paving along the existing alignment, construction of a new cul-de-sac, and the replacement of existing driveway pipes and a 24" cross line pipe. The roadway typical section consists of two 11' travel ways with a 4' grass shoulder and roadside ditch. The pavement will be constructed using 4" uniform graded aggregate base course and 1-1/2" HMA Surface Course Type C. Bids must be submitted as stated on the attached Aiken County Sealed Bid Document.

Any questions concerning the bid should be directed to procurement@aikencountysc.gov.

PLANS, SPECIFICATIONS, AND CONTRACT DOCUMENTS: Plans and Specification Documents may be obtained from the Engineer, Dennis Corporation, 1800 Huger Street, Columbia, SC 29201. There will be a non-refundable \$30.00 charge for the Bid Documents.

SPECIAL CONDITIONS: Fiber optic crossing; contractor shall be responsible for coordinating with utilities.

CONDITIONS OF WORK: The Contractor must have informed himself fully of the conditions relating to the construction of this project and the employment of labor thereon, to have inspected the site, and to have read and become familiar with all the bid documents, contract documents, and plans/sketches. Failure or omission to do so will not relieve a successful bidder of his obligation to furnish all material, equipment, and labor necessary to carry out the provisions of his contract. Insofar as possible, the Contractor in carrying out his work must employ such methods and/or means as will not cause any interruption of or interference with the work of other contractors.

RESTRICTIONS: Contractor will need to work within the easements and right-of-way. Coordination shall be through the County Engineer's Office.

SAFETY DEVICES: Contractor shall provide all needed barricades and signs for safety and remove trash and debris from the work area daily.

DAMAGE TO PROPERTY: Contractor shall be responsible for and immediately take action to repair or replace any damage adjacent to existing owner property for any reason.

UTILITIES: Any needed utilities shall be at the expense of the Contractor.

REFERENCES: References shall be provided upon request to confirm that the successful bidder is capable of performing and completing this project in a timely manner under specified conditions.

WARRANTY PERIOD: The warranty period for this project is **one (1)** year on labor and materials against defects and workmanship. This warranty period shall commence upon owner's final approval of the entire work.

AIKEN COUNTY GOVERNMENT

ROADWAY IMPROVEMENTS TO MOUNTAIN LAUREL DRIVE

LICENSES & PERMITS: The Contractor is to obtain any licenses or permits required to perform this work at no additional expense to the Owner.

INSURANCE: Proof of Liability Insurance and Workmen's Compensation Insurance must be provided prior to commencing work.

SKETCHES: Sketches are provided for the purpose of bidding and not necessarily for detailed construction. All materials to be used are to be approved by the County Engineer prior to installation. In the case of an inconsistency between the sketches and specifications or within either document, the better quality or greater quantity of work shall be provided in accordance with the interpretation of the County Engineer.

TIME OF COMPLETION: The time of completion is *one hundred and twenty (120)* calendar days, and availability of all items must be confirmed prior to commencing work. Liquidated damages are **five hundred (\$500.00) dollars** per calendar day. Written requests for additional time caused by unforeseen delays will be considered only if submitted in writing within ten (10) calendar days of event causing the delay. The work must commence 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 consecutive days thereafter, excluding major holidays.

WAIVER OF LIEN: At the completion of the project, a Waiver of Lien (Form provided by the County Engineer) shall be submitted to the County Engineer with the final Pay Request.

SECURITY FOR FAITHFUL PERFORMANCE: A Performance Bond of 100% of Bid and a Payment Bond for 100% of Bid shall be required. The Owner shall retain and hold ten (10) per cent from each pay request until all work has been completed and approved by the County Engineer and a Waiver of Lien submitted stating that all vendors have been paid for materials, labor, and supplies. See Bid Security and Bonds in the Instructions to Bidders Section.

OWNER

Aiken County Government
1930 University Parkway
Aiken, SC 29801
Telephone: (803) 642-1540
Facsimile: (803) 642-3684

INSTRUCTIONS TO BIDDERS

1. **INTENTION:** It is intended that the Instructions to Bidders, Special Conditions, General Conditions, Detail Construction Specifications and Drawings shall cover the complete work to which they relate.
2. **Definitions:** Where the following words or pronouns used in their stead occur herein, they shall have the following meaning:
 - "Owner" shall mean AIKEN COUNTY, SOUTH CAROLINA, party of first part to the following agreement, or its authorized and legal representatives.
 - "Engineer" shall mean THE COUNTY ENGINEER FOR AIKEN COUNTY, S.C.
 - "Contractor" shall mean the party of the second part to the following agreement, or the legal authorized representatives of such party.
3. **Scope of Work:** The work to be done consists of furnishing all materials and equipment and performing all labor necessary for completion of the work as set forth in the Bid, as shown on the Drawings, and as specified.
4. **Materials and Work by Owner:** The Owner will furnish and perform no labor for construction of the work under this contract except what is noted in the Special Conditions under "Work By County Forces."
5. **Contractor's License and Taxes:** Bidders must satisfy the requirements of all applicable South Carolina statutes, regulations and ordinances pertaining to bidders, contractors, licenses, permits, fees and taxes, including but not limited to Sections 40-11-10, et seg, Code of Laws of South Carolina, 1976, as amended. *The General Contractor's License number must be shown in the space provided in the Bid.*
6. **Site Examination:** The Bidder is expected and directed to examine the location of the work and to inform himself fully as to the structural and mechanical conditions; the conformation of the ground; the soil conditions; the character, quality and quantity of the materials to be encountered; the character of equipment and facilities needed preliminary to and during the prosecution of the work; the general and local conditions; and all other matters which can in any way affect the work to be done.
7. **Sub-Surface Conditions:** A sub-surface investigation has not been made on any portion of the work, and the Owner and Engineer make no representation or express any opinion on such conditions. Excavation for the project is unclassified for rock. The contractor shall include in his bid all cost of excavation and removal and replacement of unsuitable materials. The contractor shall make his own analysis of the materials to be encountered, and include prices for removal and replacement of these materials in his unit prices for construction unless allowances for removal and replacement are provided in the Bid. It is expected that quantities may be significantly less or greater than shown in the Bid since Bid quantities are established without any knowledge of the underground conditions, and it would be unusual for the quantities to be close to those actually encountered. The prospective bidder must form his own opinion of the character of the sub-surface materials to be encountered in

excavating for construction of the various facilities and completing the work, and include all costs and charges therefore in his bid.

8. **Bids:** All Bids must be made upon the Bid forms hereto annexed and shall be for materials and work shown on the Drawings and/or specified. Bid forms shall not be detached from the bound documents. Bid prices must be stated for each item for which a Bid is made. Documents are to be enclosed in a sealed envelope, addressed to:

AIKEN COUNTY GOVERNMENT
ATTN: PROCUREMENT DEPARTMENT
1930 UNIVERSITY PARKWAY, SUITE 3205
AIKEN, SOUTH CAROLINA 29801

If forwarded by mail or courier, the sealed envelope containing the Bid shall be enclosed in another envelope or courier container also addressed as specified.

- (a) **Unit Price Items:** The itemized quantities given in the Bid for unit price work shall be considered by the Contractor as the quantities required to complete the work. When the actual quantities required in the construction of the work are greater than or less than the quantities shown in the items, the amount equal to the difference in quantities at the unit prices bid for amount shall be paid.
 - (b) **Lump Sum Prices:** Where itemized prices are not given in the Bid, the Contractor shall consider the lump sum prices bid for the work shown on the Drawings and/or specified to be sufficient for completion of his Contract.
 - (c) **Total Amount Bid:** The correct total amount bid is defined as the correct sum total of the amount bid for the items in the Bid. The correct amount bid for each unit price item is defined as the product of the quantity listed in the Bid for the item, multiplied by the unit price bid.
9. **Extra Work Items in the Bid:** The Bid may contain certain unit price items entitled "Extra Work, If Ordered by the Engineer". In each such item, the estimated quantity is based on the average amount of extra work encountered in a typical job. The stated quantities are not guaranteed, but are included in the Bid in order to determine, in advance of construction, the actual low Bidder. No work included in such items will be authorized for payment without advance authorization of the work by the Engineer.
10. **Bid Security and Bonds:** A Bid Bond shall be required in an amount equal to not less than five per cent (5%) of the amount of the bid to guarantee that the successful bidder will, within ten (10) days from the date of the notice of awarded Contract, enter into a contract with the Owner, and execute to the Owner a Performance Bond and Payment Bond, the contract and bonds to be in the form set forth in this book. If, for any reason whatever, the Bidder withdraws from the competition after the bids have been opened, or refuses to execute the required contract and bonds, if his bid is accepted, the Owner may retain the amount of the certified check, or proceed against the bid bond. The surety on the Bid Bond

and Performance and Payment Bonds shall be a surety company authorized to do business in the State where the project is located. Attorneys-in-fact certified proper and effectively dated copy of their power of attorney. Performance and Payment Bonds shall be countersigned by an agent residing in the State, County, or City of the Owner, if required. Bonds and the surety thereon shall be subject to approval by the Attorney for the Owner.

11. **Bids Opened in Public**: Bidders are invited to be present at the opening of Bids, which will be in public.
12. **Right to Reject Bids**: The Owner reserves the right to reject any or all bids and to waive informalities. No bids will be received after the time set for opening Bids. Any Bidder may change or withdraw his bid, either personally or by telegraphic or written request, at any time prior to the scheduled closing time for receipt of bids, but no bid shall be changed or withdrawn by telegraph or mail received after the time set for opening Bids.
13. **Determination of Low Bid**: The contract will be awarded, if it is awarded, to the responsible and responsive Bidder or Bidders submitting the lowest bid. The Owner, in its sole discretion, will decide which is the lowest responsible and responsive Bidder. In determining a responsible Bidder, the following elements, among other things, may be considered: whether the Bidder involved (a) maintains a permanent place of business; (b) has adequate plant equipment to do the work properly and expeditiously; (c) has a suitable financial status to meet obligations incident to the work; and (d) has appropriate technical experience on projects of similar scope and types of work and experienced, qualified personnel. In determining a responsive Bidder, the following elements will be considered: (a) the completeness and regularity of the Bid Form; (b) Bid Form without excisions or special conditions, and, (c) a Bid Form having no alternative bids for any items unless requested in the technical specifications.
 - (a) The Bidder, if requested by the County Engineer, shall list prices of at least two manufacturers of each item of major equipment if listed on the Bid Form. Use lowest price for base bid. If the "make" of any item listed in the base bid column does not meet specifications, the next lowest priced "make" listed for that item which does meet specifications will be used in determining the lowest bid price. If all of the listed "makes" of the item fail to meet specifications, as determined above, the Bidder will be so notified and he may, within 48 hours of such notification, submit a make or makes of equipment which will meet the specification for the base price originally listed in the Bid. Otherwise, the Bid will be rejected on the grounds that it is non-responsive.
 - (b) The Owner has the right to apply any or all "Deductions or Additions", if any, listed in the Bid by the Engineer, for the purpose of making an award.

14. **Return of Bid Security:** Subject to the provisions of paragraph 10, the Owner will, within ten (10) days following the Bid opening date, return the certified check of all Bidders, except the certified checks posted by the three lowest Bidders; upon final award and execution of the Contract, the remaining certified checks will be promptly returned. Bid Bonds will not be returned unless requested.
15. **Interpretation of Drawings and Specifications:** If any person contemplating submitting a bid for the project is in doubt as to the true meaning of any part of the Drawings, Specifications, or other Contract Document, or as to the scope of any part of the work, he shall submit to the Engineer a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery in ample time for an interpretation to be issued before bid opening date. Interpretations of the documents will be made only by Addendum, and a copy of that Addendum will be mailed or delivered to each person receiving a set of the documents. The Owner and Engineer will not be responsible for other interpretations of the documents.
16. **Complete Work Required:** The Specifications, the Drawings and all supplemental documents are essential parts of the Contract, and requirements occurring in one are as binding as though occurring in all. They are intended to be complementary and to describe and provide for the complete work. In case of omissions from the Specifications as to items of equipment and materials or quantities therefore, the Drawings shall govern. In case of discrepancy in the Drawings, figured dimensions shall govern. It shall be the responsibility of the Bidder to call to the attention of the Engineer those omissions having a magnitude, which would affect the strength, adequacy, function, completeness and cost of any part of the work in ample time for amendment by Addendum prior to the Bid opening date.
17. **Drawings:** The character and location of the work, together with the essential details, are shown upon the Drawings.
18. **Working Drawings:** Working drawings shall consist of those detail drawings which may be required for prosecution of the work, but which are not included in the Contract Drawings. Six copies of all necessary working drawings shall be submitted by the Contractor to the Engineer unless additional copies are included in the submittal. Working drawings shall include shop details of manufactured equipment, products to be used, and all other drawings as may be required by the Specifications, and as may be necessary for the successful completion of the work. Review and approval by the County Engineer must be obtained before work involving working drawings may be performed.
 - (a) **Check by Contractor:** The Contractor shall check all working drawings for accuracy of dimensions and details, and for conformance with Contract Drawings and Specifications before submitting working drawings to the Engineer for review. The Contractor shall indicate that working drawings have been checked by affixing an appropriate stamp or notation on the face of the working drawings. Deviations from the Plans and Specifications shall be clearly and specifically called to the Engineer's attention in a written statement accompanying the drawings.

- (b) **Responsibility for Accuracy:** Review by the Engineer of the Contractor's working drawings shall not relieve the Contractor of responsibility for accuracy of dimensions and details. The Contractor shall be responsible for agreement and conformity of working drawings with the Contract Drawings and Specifications.
- (c) **Payment:** The contract price shall include the cost of furnishings all working drawings, and the Contractor shall be allowed no extra compensation for furnishing those drawings.
19. **Cooperation of Contractor:** The Contractor will be supplied with five (5) copies of the Drawings and Specifications. The Contractor shall have available on the work, at all times, one (1) copy of the Drawings and Specifications. He shall give the work the constant attention necessary to facilitate the progress thereof, and shall cooperate with the Engineer and other contractors in every way possible.
20. **Construction Stakes:** Subsidiary lines and grades shall be laid out by the Contractor from the controlling lines and bench marks established by the Engineer, or from measurements shown. All lines and grades shall be subject to checking by the Engineer, but that checking shall in no way relieve the Contractor from responsibility for their labor and assistance as the Engineer may require in laying-out work, establishing bench marks, and checking and measuring the work.
21. **Authority and Duties of Inspector:** Inspectors shall be authorized to inspect all work done and all materials furnished, including preparation, fabrication, and manufacture of the materials to be used. The inspector shall not be authorized to alter or waive requirements of the Drawings and Specifications. He shall call the attention of the Contractor to failure of the work and/or materials to conform to the Drawings and Specifications. He may reject materials or suspend work until questions at issue can be referred to, and be decided by the Engineer. The presence of the inspector shall in no way lessen the responsibility of the Contractor.
22. **Inspection:** The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether or not the work performed and materials used are in accordance with the requirements and intent of the Specifications and Drawings. No work shall be done or materials used without suitable supervision or inspection by the Engineer or his representative. Failure to reject defective work and materials shall neither, in any way, prevent later rejection when those defects are discovered, or obligate the Owner to any final acceptance.
23. **Rejection of Work and Materials:** All materials furnished and work done when not in accordance with the Specifications and Drawings will be rejected, shall be immediately removed, and other work shall be done and materials furnished in accordance therewith. If the Contractor fails to remove the work and materials within forty-eight (48) hours after having been ordered to do so, then the Owner shall have the right and authority to stop the Contractor and his work at once until the Contractor removes the work and materials.
24. **Defective Materials and Work:** The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill the Contract. Defective work shall be made

good by the Contractor, notwithstanding that such work and materials have been previously inspected by the Engineer and accepted or estimated for payment. Failure by the Engineer to condemn or reject improper materials and workmanship shall be considered neither as a waiver of defects, which may be discovered late, nor as preventing the Owner at any time subsequently from recovering damages for work actually defective. All work shall be guaranteed against defects in workmanship and materials for a minimum period of one year from date of Owner acceptance.

25. **Corrections:** Should any portion of the Drawings and specifications be obscure or in dispute, they shall be referred to the Engineer, and he shall decide as to the true meaning and intent. He shall also have the right to correct errors and omissions at any time when those corrections are necessary for the proper fulfillment of the Drawings and Specifications.
26. **Disagreement:** Should any disagreement or difference arise as to the estimate, quantities, or classifications, or as the meaning of the Drawings and/or Specifications, on any point concerning the character, acceptability, and nature of the several kinds of work and materials and construction thereof, the decisions of the Engineer shall be final, conclusive, and binding upon all parties to the Contract.
27. **Weather:** During unseasonable weather, all work must stop when the Engineer so directs, and all work must be suitably protected.
28. **Land and Rights-of-Way:** The Owner will furnish all land and rights-of-way necessary for the carrying out of this contract and the completion of the work herein contemplated, and will use due diligence in acquiring said land and rights-of-way as speedily as possible. It is possible that all lands and rights-of-way may not be obtained as herein contemplated before construction begins, in which event the Contractor shall begin his work upon such land and rights-of-way as the Owner may have previously acquired. The Owner will provide no right-of-way over other property. The Contractor shall take every precaution to inconvenience as little as possible the owners or tenants of adjacent property. Public Highways shall not be obstructed. Expense shall be borne by the Contractor to repair or pay for any damage or injury to either private or public property during progress of the work.
29. **Competent Labor:** The Contractor shall employ only competent and skilled personnel on the work. The Contractor shall at all times have a Superintendent, satisfactory to the Engineer, capable of acting as the Contractor's agent of the work, and who shall receive instructions from the Engineer or his authorized representative. The Superintendent shall have full authority to execute the orders and directions of the Engineer without delay, and to promptly supply these materials, tools, plant equipment, and labor as may be required. The Contractor shall, upon demand by the Engineer, immediately remove that Superintendent, Foreman, and Workmen whom the Engineer may consider to be incompetent or undesirable, or both.

30. **Laws, Regulations, and Permits:** The Contractor shall comply with all applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the work specified herein. Permits and licenses necessary for construction of the work shall be secured and paid for by the Contractor.
31. **Sales Tax:** Bidders shall include in the Bid an allowance for payment of State Sales Tax on all taxable materials specified to be furnished by the Contractor and incorporated into the work under this Contract.
32. **Sanitary Facilities:** Necessary sanitary facilities for the use of personnel on the work shall be erected and maintained by the Contractor in such manner and at such points as shall be approved by the Engineer. Facilities shall be maintained in sanitary conditions and in strict accordance with the applicable regulations. No unsanitary act shall be committed outside sanitary facilities.
33. **Storage Facilities:** Should the Contractor so desire, he may build storage facilities for housing tools, machinery and supplies, but those facilities will be permitted only at places approved by the Engineer, and their surroundings shall be maintained at all times in a sanitary and satisfactory manner. On or before completion of the work, those facilities shall be removed at the expense of the Contractor.
34. **Water, Sewer, and Electric Power Supply:** The Contractor shall make his own arrangements for water, sewer, and electric power supply for his construction operations.
35. **Access Roads:** Streets, roads and drives used by the Contractor for access to and from the job site shall be protected from damage in excess of that caused by the normal traffic of vehicles used for, or in connection with, construction work. Project-related damages shall be repaired immediately, and the area shall be left in good condition at the end of the construction period.
36. **Order of Work:** The prosecution, order and sequence of the work shall be as provided herein, or as approved by the Engineer, but that approval shall in no way affect the responsibility of the Contractor.
37. **Protective Works:** The Contractor shall furnish and install all necessary temporary signage for the protection of the work, including lights at night, barricades, and warning signs.
38. **Safety Regulations:** The performance of work under this Contract shall comply with safety regulations prescribed by the Owner, those of the National Occupational Safety and Health Act of 2011, and the requirements of the State where project is located. Each Bidder shall examine and satisfy himself as to the character and extent of these regulations.

39. Allowable Time for Completion: The time allowed for completion of all work as stated in the Bid and Construction Agreement shall be as specified in consecutive calendar days after notifications by written order from the Engineer to proceed with the work. Such notifications will be issued upon completion of execution of the contract documents.
40. Liquidated Damages: The Contractor shall pay to the Owner as liquidated damages the sum of five hundred dollars (\$500.00) for each calendar day that the Contractor shall be in default of completing the work within the time limit stated within the Bid.

END INSTRUCTION TO BIDDERS

GENERAL CONDITIONS

1. **Contract Security:** The Contractor must furnish two Security Bonds (forms attached) each in an amount at least equal to one hundred percent (100%) of the contract price, one as a security for the faithful performance of this Contract and one for the payment of all persons performing labor and furnishing materials in connection with this Contract. The Surety on each Bond must be a surety company satisfactory to the Owner, duly authorized to do business in the State of South Carolina. The Bonds must be countersigned by an agent who is a resident of the State, County or City of the Owner, if required. The person executing the Bond on behalf of the surety must file with the Bond a general power of attorney unlimited as to amount and type Bond covered by such power of attorney, and certified to by an official of said surety.

2. **Contractor's and Subcontractor's Insurance:** The Contractor must not commence work under this Contract until he has obtained all the insurance required under this paragraph and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved. All certification of insurance and policies must contain the following clause: "The insurance covered by this Certificate will not be canceled or materially altered unless at least thirty (30) days prior written notice has been given to the Owner".
 - (a) **Compensation Insurance:** The Contractor must procure and must maintain during the life of this Contract, including the entire period of the Contractor's Warranty, Workmen's Compensation Insurance for all of the employees engaged, or to be engaged, in work on the project under this Contract; and in any case any such work is sublet, the Contractor must require the subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees engaged, or to be engaged, in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation Insurance. In case any class of employees engaged in hazardous work on the project under this Contract is not protected under the Workmen's Compensation Insurance Statute, the Contractor must provide Workmen's Compensation coverage for and hold harmless the Owner for the protection of such of his employees not otherwise protected.

 - (b) **Public Liability, Property Damage, and Automobile Liability Insurance:** The Contractor must take out, and maintain during the life of this Contract, including the entire period of the Contractor's Warranty, Comprehensive General Liability Insurance, including products and completed operations, XC and U coverage; the ISO Broadform General Liability endorsement to its equivalent thereof; Automobile Liability Insurance; and such other insurance as the Owner may direct and must protect him and any subcontractor performing work covered by this contract from claims for damage for personal injury, including accidental death, as well as from claims for property damage, which may arise from operations under this Contract, whether such operations be by the insured or by anyone directly or indirectly employed by them. The Owner must be listed as an additional Insured on all such policies and certificates of insurance. The amount of such insurance must be as follows:
 - (1) **Bodily Injury Insurance** in an amount of not less than \$500,000 for bodily injury, including accidental death to any one person, and subject to the same limit for each person, in an amount not less than \$1,000,000 on account of one accident.

 - (2) **Property Damage Insurance** in an amount not less than \$500,000 for any one damage claim, and in an aggregate amount up to \$1,000,000 during a period of twelve (12) months.

(3) Automobile Liability Insurance:

- a. For bodily injury, including accidental death to any one person in an amount not less than \$500,000 and subject to the same limit for each person, in an amount not less than \$1,000,000 on account of one accident.
 - b. For property damage in an amount not less than \$500,000 for any one damage claim and in an aggregate amount up to \$1,000,000 during a period of twelve (12) months.
 - c. Owner's Protective Liability Insurance: The Contractor must provide a policy issued in the name of the Owner for liability and property damage in the same amounts as required for the Contractor.
 - d. Umbrella Policy: Umbrella coverage must be obtained if required, to provide for an increase in basic policy coverage to an amount not less than \$1,000,000.
 - e. Builder's Risk or Installation Floater Insurance (Fire and Extended Coverage): The Contractor must insure all work against loss or damage by fire and against loss or damage covered by the standard extended coverage insurance, and the amount of the insurance at all times must be at least equal to the amount paid on account of work and materials. The policies must be in the names of the Owner and the Contractor as their interests may appear.
 - f. Proof of Coverage of Insurance: The Contractor must furnish the Owner with certificates showing satisfactory proof of carriage of the insurance required before commencing work on this contract. Certificates of insurance for subcontractors are not required to be submitted to the Owner.
 - g. Scope of Insurance: The insurance required under sub-contractors (b), (c) and (d) hereof must provide protection for the Contractor and his subcontractors respectively, as well as the Owner, against damage claims which may arise in any way from operations under this Contract, whether such operations be by the insured or by anyone directly or indirectly employed by him.
 - h. Nothing contained in this contract or any document forming a part hereof or attached thereto, shall be construed to, change or increase the limitations on the liability of the Owner set forth in the South Carolina Tort Claim Act.
3. Accident Prevention: Precaution must be exercised at all times by the Contractor for the protection of all persons, including employees and property. Hazardous conditions must be guarded against or eliminated.

The Contractor shall be responsible for all injuries or damages to persons or property, and shall defend, indemnify, save and hold harmless the Owner, its officers, employees and agents, from all damages, attorneys' fees and costs by reason of injury to person or property resulting from performance of the work or in guarding the same, or from any improper materials, implements, or appliances used in its construction, or on account of any act or omission of the Contractor and sub-contractor, their agents or employees. The whole or as much of the monies due under, and by virtue, of this Contract as may be considered necessary by the Owner shall or may be retained by the Owner until all suits or claims for damages shall have been settled, and evidence to that effect furnished to the satisfaction of the Owner.

- (a) In emergencies affecting the safety of persons, the work or property at the site or adjacent thereto, the Contractor without special instruction or authorization from the Engineer or Owner, must act to prevent threatened damage, injury or loss. The Contractor must make prompt written notice to the Engineer and Owner of any changes in the work or deviations from the Contract Documents caused thereby.
 - (b) Safety and health facilities and procedures must be in accordance with the requirements of the National Occupation Safety and Health Act of 1970, (OSHA), and subsequent amendments. The Contractor must comply with the Department of Labor's Safety and Health Regulations for construction promulgated under the National Occupational Safety and Health Act of 1970 (P.L. 91-596), and under Section 107 of the Contract Work Hours and Safety Standard Act (P.L. 91-54), and subsequent amendments. The Contractor must comply with OSHA Hazard Communication Standard, Title 29 Code of Federal Regulations 1910.1200, by compiling a master hazardous chemical list (including locations), expanding MSDS's, ensuring that containers are labeled, and providing employee training.
4. Laws of the Place: The Contractor must conduct the construction as defined in the Bid in accordance with the applicable national, state, county, and municipal laws, ordinances and regulations. The Contractor must keep himself fully informed of those laws, ordinances, and regulations which would, in any way, affect those engaged and employed in the project, the materials used in the project, and the conduct of the project; and informed of all orders and decrees of bodies and tribunals having jurisdiction and authority over the project. If discrepancies, or inconsistencies, or both, should be discovered in the Construction Agreement, Drawings, or Construction Specifications, or combination thereof, in relations to laws, ordinances, regulations, orders and decrees, the Contractor must forthwith report the fact, in writing, to the Owner. The Contractor must protect and indemnify the Owner, his officers, agents and employees, against claims and all liabilities arising from, or based on, the violation of those laws, ordinances, regulations, orders, and decrees, whether by the Contractor or by his employees or agents.
5. Payment of Contractor:
- (a) Not later than 30 days after pay requests are promptly and properly submitted, the Owner will make a partial payment to the Contractor on the basis of a duly certified and approved estimate of the work performed during the preceding performance of this Contract. The Owner will retain ten percent (10%) of the amount of each estimate until such time that all work has been completed and approved by the County Engineer and a Waiver of Lien submitted stating that all vendors have been paid for materials, labor and supplies.
 - (b) In preparing estimates, the material not subject to deterioration delivered on the site and preparatory work done will be taken into consideration for inclusion on the partial payment request. The amount of eligible on-site material included in the partial payment shall be reduced by ten percent (10%) of the amount of the material cost as shown on the submitted material invoice.
 - (c) All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision must not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the Contract.

(d) **Owner's Right to Withhold Certain Amounts and Make Application Thereof:** The Contractor agrees that he will indemnify and save the Owner harmless from all claims growing out of the demands of subcontractors, laborers, workers, mechanics, material men, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies including commissary, used in the furtherance of the performance of this contract. The Contractor must furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If the Contractor fails so to do, then the Owner may, after having served written notice on the said Contractor, either pay unpaid bills, of which the Owner has written notice, directly, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such claims until satisfactory evidence is furnished that all liabilities have been fully discharged, whereupon payment to the Contractor shall be resumed, in accordance with the terms of this Contract; but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor or his Surety. In paying any unpaid bills of the Contractor, the Owner shall be deemed the agent of the Contractor, and the Owner shall not be liable to the Contractor for any such payments made in good faith.

6. **Payment by Contractor:** The Contractor shall pay:

- (a) For all transportation and utility services no later than 20 days following that month in which services are rendered;
- (b) For all materials, tools, and other expandable equipment not less than ninety percent (90%) of the cost thereof, no later than 20 days following that month in which such materials, tools, and equipment are delivered at the site of the project; and
- (c) To each of his subcontractors, no later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors to the extent of such subcontractors' interest therein.

7. **Subcontracting:**

- (a) The Contractor may utilize the services of specialty sub-contractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors.
- (b) The Contractor must not subcontract the complete work, or any major portion thereof, and must not award any work to any subcontractor without prior written approval by the Owner, which approval will not be given until the Contractor submits to the Owner, a written statement concerning the proposed award to the subcontractor, which statement must contain such information as the Owner may require.
- (c) The Contractor shall be as fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.
- (d) The Contractor must cause appropriate provisions to be inserted in all subcontracts relative to the work to bind sub-contractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of subcontractors, and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provisions of the Contract Documents.

- (e) The Contractor must indemnify and save the Owner and the Owner's agents harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, tools and all supplied, incurred in the furtherance of the performance of the work.
 - (f) Nothing contained in this Contract shall create any contractual relationship between any subcontractor and the Owner.
8. **Assignments:** The Contractor must not assign the whole or any part of this Contract, or any monies due, or to become due hereunder without written consent by the Owner. In case the Contractor assigns all, or any part of any monies, or to become due under this Contract, the instrument of assignment must contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due, or to become due, to the Contractor shall be subject to prior liens of all persons, firms, and corporations for service rendered or materials supplied for the performance of the work called for in this Contract.
9. **Time for Completion and Liquidated Damages:**
- (a) It is hereby understood, and mutually agreed, by and between the Contractor and the Owner, that the date of beginning, rate of progress, and the time for completion of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this Contract shall be commenced on a date to be specified in the "Notice to Proceed" and completed within the time period specified herein above. The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will assure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for completion of the work described herein is a reasonable time for the completion of same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
 - (b) IF THE SAID CONTRACTOR SHALL NEGLECT, FAIL OR REFUSE TO COMPLETE THE WORK WITHIN THE TIME HEREIN SPECIFIED, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner the amount specified in the Contract not as a penalty, but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages which the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain.
 - (c) It is further agreed that time is of the essence of each and every portion of this Contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where an additional time is allowed under the contract for the completion of any work, the new time limit fixed by such extension shall be of the essence of this Contract.
 - (d) The Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:
 - i. To any preference, priority, or allocation order duly issued by the government.

- ii. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and unusually severe weather.
- iii. To any delays of subcontractors occasioned by any of the causes specified in subsections (a) and (b) of this article.

Provided that within seventy-two (72) hours from the beginning of such delay, the Contractor must notify the Owner in writing of the causes of the delay. The Owner, shall then ascertain the facts and the extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

10. Construction Schedule and Periodic Estimates:

- (a) Immediately after execution and delivery of the Contract, and before the first partial payment is made, the Contractor must deliver to the Owner an estimated construction progress schedule in a form satisfactory to the Owner, showing
 - i. The proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and
 - ii. The anticipated amount of each monthly payment that will become due to the Contractor in accordance with the progress schedule.
- (b) The Contractor must also furnish on forms acceptable to the Owner:
 - i. A detailed estimate giving a complete breakdown of the Contract price and
 - ii. Periodic itemized estimates of work done for the purpose of making partial payments thereon.

The costs employed in making up any of these schedules will be used for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the contract price.

- 11. Responsibility of Contractor: If, through acts of neglect on the part of the Contractor, any other Contractor, or any subcontractor shall suffer loss or damage on the work, the Contractor agrees to settle with such other contractor or subcontractor by agreement or arbitration if such other contractor or subcontractor will so settle. If such other contractor or subcontractor shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor, who must defend and indemnify and save and hold harmless the Owner against any such claim.
- 12. Extras: Without invalidating the Contract, the Owner may order extra work or make changes by altering, adding to or deducting from the work, the Contract sum being adjusted accordingly, and the consent of the Surety being first obtained where necessary or desirable. All work of the kind bid upon shall be paid for at the price stipulated in the Bid, and no claims for any extra work or materials shall be allowed unless the work is ordered in writing by the Owner or the Engineer, acting officially for the Owner, and the price is stated in such order.

13. Changes in Work:

- (a) Should the Contractor encounter, or the Owner discover, during the progress of the work, subsurface or latent conditions at the site materially differing from those shown on the Drawings or indicated in the Specifications, or unknown conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Drawings and Specifications, the attention of the Owner shall be called immediately to such conditions before they are disturbed. The Owner must thereupon promptly investigate the conditions, and if it finds that they do so materially differ, the Contract shall be modified, with the written approval by the Owner, to provide for any increase or decrease of costs or difference in time resulting from such conditions. No changes in work shall be made without prior written approval by the Owner.
- (b) The Contractor must proceed with the performance of any changes in the work so ordered in the field by the Engineer and/or Owner unless the Contractor believes said change entitles him to a change in Contract price and/or time, in which event the Contractor must give the Engineer written notice thereof within seven days after receipt of the field order and must not execute the field change pending the execution of a change order unless the change is for accident prevention as cited herein.
- (c) The Contractor must furnish to the Owner, when required, an itemized breakdown of the quantities and prices used in computing the value of any change that might be ordered. In figuring these changes, instructions for measurement of quantities set forth in the Specifications must be followed.
- (d) Charges or credits for the work covered by the approved change shall be determined by the Owner using one or more or a combination of the following methods:
 - i. Unit bid prices stipulated in the Bid or as subsequently approved, which unit prices shall include allowances for overhead and profit.
 - ii. An agreed lump sum.
 - iii. The actual cost, by keeping a correct account including all vouchers, for:
 - 1. Labor, including foremen;
 - 2. Materials entering permanently into the work;
 - 3. Ownership or rental cost of power tools and construction equipment actually used;
 - 4. Power and consumable supplies for operation of power equipment actually used;
 - 5. Prorate charges for insurance covering public liability, Workmen's Compensation, Old Age and Unemployment, and also Social Security.

To the costs in (c) above shall be added a negotiated fixed fee for overhead and profit, not to exceed fifteen percent (15%) of the above items, except that actual cost only will be allowed for Social Security and Unemployment Insurance.

Among the items considered as overhead are costs for insurance other than above, bonds, superintendence, timekeeping, clerical work, watchman, use of small tools, general office expense and miscellaneous. The allowance for combined overhead and profit thus calculated shall be the only such allowance included in the total cost of the work performed by the Contractor or his subcontractor. If the work was performed by sub-contract, the Contractor may add a negotiated fixed fee for overhead and profit not to exceed five percent (5%) of the subcontract cost.

If the Owner determines that the Contractor, pursuant to his obligations under paragraph 6 and 7 of the Instruction to Bidders and Special Provisions, should have discovered the conditions prior to the awarding of the bid for the project, it may require the Contractor to complete the project for the contract price and the condition shall be deemed to be materially different as provided herein.

14. **Claims for Extra Cost:** No claim for extra work or cost shall be allowed, unless the same was done pursuant to a written order by the Engineer, as aforesaid, and the claim presented with the first estimate after the changed or extra work is done. When work is performed under the terms of subsection 13(c) of these General Conditions, the Contractor must furnish satisfactory bills, payrolls and vouchers covering all items of cost and when requested by the Owner, give the Owner access to accounts relating thereto.

15. **Materials, Services and Facilities:**

(a) It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor must provide and pay for all materials, labor, tools, equipment, water, lights, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

(b) Materials and equipment must be stored in a manner to insure the preservation of their quality and fitness for the work.

(c) Any work necessary to be performed after regular working hours, on Sundays or legal holidays, shall be performed without additional expense to the Owner.

16. **Patents:**

(a) The contractor shall defend, indemnify, hold and save the Owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including attorney's fees cost and expense, for or on account of any patented or unpatented inventions, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Owner, unless otherwise specifically stipulated in the Contract Documents.

(b) If the Contractor uses any design, device or materials covered by letter, patents or copyrights, he must provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device or material. It is mutually agreed and understood that, without exception, the Contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall defend, indemnify and save and hold harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or material or any trademark or copy-right in the connection with work performed under this Contract, and shall indemnify the Owner for any attorneys' fees, cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

17. **Inspection and Testing of Material:** Unless otherwise specifically provided for in the Specifications, the inspection and testing of material and finished articles to be incorporated in the work at the site shall be made by bureaus, laboratories or agencies arranged for by the Contractor and as approved by the Engineer. The Contractor shall furnish all such extra quantities of materials and items as may be required for testing, and shall deliver same to the laboratory. The cost of furnishing and delivering samples to the laboratory shall be paid for by the Contractor.

Where the Detailed Specifications call for certified copies or mill or shop tests to establish conformance of certain materials with the Specifications, it shall be the responsibility of the Contractor to assure the delivery of such certifications to the Owner.

No materials or finished articles shall be incorporated into the work until such materials and finished articles have passed the required tests. The Contractor must promptly segregate and remove rejected material and finished articles from the work site.

The testing and approval of materials by the laboratory or laboratories approved by the Engineer shall not relieve the Contractor of any of his obligations to fulfill his Contract and guarantee of workmanship and materials as called for in Paragraph 21 entitled "General Warranty for one year After Completion of Contract", herein. The Contractor may, at his option and at his expense, cause such other tests to be conducted as he may deem necessary to assure suitability, strength and durability of any material or finished articles.

18. **Right of the Owner to Terminate Contract:** In the event that any of the provisions of this Contract are violated by the Contractor or by any of his subcontractors, the Owner may serve written notice upon the Contractor and his Surety of his intention to terminate the Contract, such notices to contain the reasons of such intention to terminate the Contract; and unless within ten (10) days after the serving of such notice upon the Contractor, such violation or delay shall cease and satisfactory arrangement of correction be made, the Contract shall, upon the expiration of said ten (10) days, terminate.

In the event of any such termination, the Owner shall immediately serve notice thereof upon the Surety and the Contractor, and the Surety shall have the right to take over and perform the Contract; provided, however, that if the Surety does not commence performance thereof within five (5) days from the date of the mailing to such Surety of notice of termination, the Owner may take over the work, prosecute the same to completion by contract or by force account at the expense of the Contractor, and the Contractor and his Surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event, the Owner may take possession of and utilize in completing the work, such materials, appliances, and plant as may be on the work site and necessary therefore.

19. **Notices and Service Thereof:**

- (a) Any notice to the Contractor from the Owner, relative to any part of this Contract, shall be in writing and considered delivered and the service thereof completed, when said notice is posted by certified mail, to the said Contractor at his last given address, or delivered in person to said Contractor or his authorized representative on the work, or is deposited in the regular United States mail in a sealed, postage prepaid envelope, and the receipt thereof is acknowledged by the Contractor.

(b) Unless otherwise specified in writing to the Contractor, all papers required to be delivered to the Owner shall be delivered to the County Engineer. Any notice to or demand upon the Owner shall be considered sufficiently given if it is delivered to the office of said County Engineer or deposited in the United States mail in a sealed postage prepaid envelope properly addressed to the County Engineer, or to such other address as the Owner may subsequently specify in writing to the Contractor for such purposes, and it is received by the County Engineer.

20. Quantities of Estimate: The estimated quantities of work to be done and materials to be furnished under this Contract shown in any of the documents, including the Bid, are given for use in comparing bids, and to indicate approximately the total amount of the contract. Except as herein otherwise specifically limited, the right is especially reserved by the Owner to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated by this Contract.

21. General Warranty After Completion of Contract: For a period of at least one year after completion of the Contract and final acceptance of the work by the Owner, the contractor warrants the fitness and soundness of all work done and materials and equipment put in place under the Contract. Neither the final certificate of payment nor any provision in the Contract Documents, nor partial or entire occupancy of the premises by the Owner, shall constitute an acceptance of work not done in accordance with the Contract Documents, or relieve the Contractor of liability for this warranty or for any other warranties or responsibility for faulty materials, equipment or workmanship. The Contractor must remedy any defects in the work and pay for damage resulting there from discovered with a period of one year from the date of final acceptance of work unless a longer period is specified. The Owner will give notice of observed defects with reasonable promptness. This provision in no way affects the Contractor's responsibility to the Owner for latent defects.

22. Contractor's Obligations: The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper and complete all work required by the Contract within the time herein specified, in accordance with the provisions of this Contract and said Specifications, the Plans and Drawings of the work covered by this Contract, and any and all supplemental plans and drawings of the work, and in accordance with the directions of the Engineer as given from time to time during the progress of the work. The Contractor shall furnish, erect, maintain and remove such construction plant and such temporary works as may be required. He alone shall be responsible for the safety, efficiency and adequacy of his plan, appliance and methods, and for any damage which may result from their failure or their improper construction, maintenance or operation.

The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the Contract Specifications, and shall do, carry on, and complete the entire work to the satisfaction of the Engineer and the Owner.

23. Engineer's Authority: The Engineer shall give all orders and directions contemplated under this Contract and Specifications relative to the execution of the work. The Engineer shall determine the amount, quality, acceptability and fitness of several kinds of work and materials which are to be paid for under the Contract and shall decide all questions which may arise in relation to said work and the construction thereof. The Engineer's estimates and decisions shall be final and conclusive, except as herein otherwise expressly provided. In case any question shall arise between the parties hereto relative to said Contract or Specifications, the determination or decision of the Engineer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this Contract affected in any manner or to any extent by such question.

The Engineer shall decide the meaning and intent of any portion of the Specifications and or any Plans or Drawings where the same may be found obscure or be in dispute.

Any difference or conflicts, in regard to their work, which may arise between the Contractor and other contractors performing work for the Owner, shall be adjusted and determined by the Engineer.

The Engineer and Owner will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

24. **Owner's Prerogative:** The Owner shall have the right to enter the site for the purpose of doing work and/or having work done which is not covered by the Contract Documents. This provision shall not relieve the Contractor of his obligations cited in Item 22 herein, excepting work done by the agents or employees of the Owner. Prior to completion and acceptance of the work set forth in the Contract, the Owner with the concurrence of Engineer and Contractor, may use any completed or substantially completed portion of the work, by such use shall not constitute an acceptance of that portion.
25. **"Or Equal" Clause:** With the exception of major items of mechanical and electrical equipment, whenever a material or article required is specified or shown on the Drawings by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will meet the design criteria and is equal in function and durability, as determined by the Engineer prior to the bid, will be considered acceptable.
26. **Prohibited Interests:** No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract, or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar function in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract, insurance contract, or any other contract pertaining to the project.
27. **Reports, Records and Data:** The Contractor and each of his subcontractors must submit to the Owner such schedules, payroll, reports, estimates, records and other data as the Owner may request, or as may be required herein, concerning the work performed or to be performed under this Contract.
28. **Acceptance of Work and Final Payment:** Before final acceptance of the work and payment to the Contractor of the percentage retained by the Owner, the following requirements must be complied with:
 - (a) **Final Inspection:** Upon written notice from the Contractor that his work is completed, the Engineer will make a final inspection of the work, and must notify the Contractor of all instances where his work fails to comply with the Contract Drawings and/or Specifications, as well as any defects he may discover. The Contractor must immediately make such alterations necessary to make the work comply with the Contract Drawings and Specifications to the satisfaction of the Engineer.
 - (b) **Cleaning Up:** Before the work is considered as complete, all rubbish and unused material due to or connected with the construction must be removed and the premises left in a condition satisfactory to the Owner. Streets, curbs, cross-walks, fences, and other public and private property or rights-of-way disturbed or damaged must be restored to their former condition. Final acceptance will be withheld until such work is finished.

- (c) **Liens**: Final acceptance of the work will not be granted, and the retained percentage will not be due or payable until the Contractor has furnished the Owner proper and satisfactory evidence under oath that all claims for labor and material employed or used in the construction of the work under this contract have been settled, and that no legal claims will be filed against the Owner for such labor or materials.
- (d) **Final Estimate**: Upon completion of all cleaning up, alterations and repairs required by the final inspection or operation test, the satisfactory completion of the operating test, and upon submitting proper and satisfactory evidence to the Owner that all claims have been settled, the Engineer will issue a certificate of final acceptance of the work. The Contractor shall then prepare his final estimate. After review of the final estimate by the Engineer, and approval by the Owner, the final payment shall then become due.
29. **Minimizing Silting and Bank Erosion During Construction**: During construction protective measures must be taken and maintained to minimize bank erosion, and the silting of creeks and rivers adjacent to work being performed during construction. This must be done as according to the Erosion Control Section of the Specifications and the Storm Water Pollution Plan.
30. **Restoration of Disturbed Areas**: All areas disturbed by or during construction must be restored to their existing or better condition. This provision is not to be interpreted to require replacement of trees and undergrowth in undeveloped sections of rights-of-way.
31. **Chemicals Used During Construction**: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactor or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal or residue must be in strict conformity with manufacturer's instructions.
32. **Acceptance of Final Estimate**: The acceptance by the Contractor of the final payment shall operate as a release to the Owner from all claims and liabilities to the Contractor for all work done or materials furnished, or for any act of the Owner or its agents affecting the work.
33. **Inspection by Agencies**: The representatives of all local, state and federal regulatory agencies legally authorized to have access shall have access to the work wherever it is, in preparation or progress, and the Contractor must provide proper facilities for such access and inspection.
34. **Litigation**: In the event of litigation in which the Owner is or becomes a party, the Contractor agrees and consents that the litigation shall be filed in or transferred to the Court of Common Pleas of Aiken County, South Carolina or the Aiken Division of the United States District Court for the District of South Carolina and that the laws of the State of South Carolina shall apply to and govern such litigation. The Contractor further agrees to cooperate with the Owner in obtaining the transfer of such litigation to those courts by promptly signing all documents necessary thereto.
35. **Unauthorized Aliens and Public Employment**:
- (a) By signing its bid, offer, or proposal, Contractor certifies that it will comply with the applicable requirements of Title 8, Chapter 14 of South Carolina Code of Laws and agrees to provide to the Owner upon request any documentation required to establish either:
- i. That Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or
 - ii. That Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14.

- (b) Pursuant to Section 8-14-60, “A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony, and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both.”
- (c) Contractor agrees to include in any contract with its subcontractors language requiring its subcontractors
 - i. To comply with the applicable requirements of Title 8, Chapter 14, and
 - ii. To include in their contracts with their sub-subcontractors language requiring their sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14.

END GENERAL CONDITIONS

BID DOCUMENT

**AIKEN COUNTY GOVERNMENT
ROADWAY IMPROVEMENTS TO MOUNTAIN LAUREL DRIVE**

TO THE COUNTY AND COUNTY COUNCIL
OF AIKEN COUNTY, SOUTH CAROLINA

Submitted _____, 2016

The undersigned, as Bidder, hereby declares:

1. That the only person or persons interested in the bid as principal or principals is (or are) named herein and that no person other than mentioned herein has any interest in this Bid or in the Contract to be entered into.
2. That this bid is made without connection with any other person, company or parties making a bid.
3. That in all respects, this bid is made fairly and in good faith, without collusion or fraud.

The Bidder further declares:

4. That he has examined the site of the work and has informed himself fully in regard to all conditions pertaining to the place where the work is to be done.
5. That he has examined the Drawings and Specifications for the work and contractual documents relative thereto and has read all Special Provisions and General Conditions furnished prior to the opening of bids.
6. That he has satisfied himself relative to all work to be performed.

The Bidder proposes and agrees, if this Bid is accepted, to:

- A. Contract with Aiken County, South Carolina, a body politic and corporate and a political subdivision of the state of South Carolina (hereinafter called The Owner), in the form of contract specified,
- B. To furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of the work in full and complete accordance with the shown, noted, described, and reasonably intended requirements of the Drawings, Specifications and Contract Documents to the full and entire satisfaction of The Owner, with a definite understanding that no money will be allowed for extra work except as set forth in the attached General Conditions and Contract Documents, for the following prices:

BID DOCUMENT
AIKEN COUNTY GOVERNMENT
ROADWAY IMPROVEMENTS TO MOUNTAIN LAUREL ROAD

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Bid</u>	<u>Total</u>
1	Mobilization	1	LS	_____	_____
2	Construction Stakes, Lines & Grades	1	LS	_____	_____
3	Traffic Control- Includes Construction Signage	1	LS	_____	_____
4	Clearing and Grubbing within Roadway, Drainage Easement and Construction Limits	0.96	AC	_____	_____
5	Unclassified Excavation	1,068	CY	_____	_____
6	Moving Items: Mailboxes, Street Signs, Etc. to R/W Line or Designated Area	1	LS	_____	_____
7	Subgrade Course – Shape and Compact (To Include Testing Every 800 LF)	3,775	SY	_____	_____
8	4” Graded Aggregate Base Course (Includes and Testing Every 800 LF)	3,775	SY	_____	_____
9	Prime Coat	3,775	SY	_____	_____
10	1.5” Minimum Compacted Hot Laid Asphalt Concrete Surface Course, SCDOT Type C (Incl. Cost of Coring Every 800 LF.)	4,309	SY	_____	_____
11	Paving within SCDOT ROW (includes 2” Type C Asphalt Surface Course, 4” Type C Asphalt Intermediate Course, and 6” GABC Base Course)	124	SY	_____	_____
12	Cul-De-Sac Raised Edge- 2 Foot Wide (To Include Items 5,7,8,9 & 10)	235	LF	_____	_____
13	Driveway Paving to ROW (To Include Items 5,7,8,9 & 10)	15	EA	_____	_____
14	18” Reinforced Concrete Pipe (Class III)	368	LF	_____	_____
15	24” Reinforced Concrete Pipe (Class III)	48	LF	_____	_____

16	Rip Rap (Class B)	24	SY	_____	_____
17	Geotextile/ Erosion Control Under Riprap (Class II, Type B)	24	SY	_____	_____
18	White 24" Stop Bar – Thermo (125 MIL)	26	LF	_____	_____
19	Permanent Raised Yellow Pavement Bi-Directional Markers (4"x4")-every 80 LF	15	EA	_____	_____
20	Permanent Roadway Signs	3	EA	_____	_____
21	Erosion Control Maintenance – (Includes Temporary Seeding and Silt Fence)	1	LS	_____	_____
22	Silt Fence	601	LF	_____	_____
23	Sediment Tube	63	EA	_____	_____
24	Temporary Erosion Control Blanket (Class B)	1,865	SY	_____	_____
25	Stabilized Construction Entrance	332	SY	_____	_____
26	Permanent Cover	0.9	AC	_____	_____
27	6"perforated Pipe Underdrain with End Protectors if Required	500	LF	_____	_____

Total Amount of Bid (including all applicable sales tax):

_____ (\$ _____)
(words) (numerals)

- Note:
1. Contractor is responsible for all utilities known and unknown. It shall be the responsibility of the Contractor to inspect the site for potential utility conflicts and, if necessary, coordinate any relocation with utility provider.
 2. No work shall be permitted on Saturday or Sunday.
 3. Prior to start of construction; obtain concurrence of the Engineer in regards to locating limits of clearing.
 4. Changes involving increased cost of project or changes in alignment must be specifically authorized by the Owner and Engineer.

The Bidder further proposes and agrees hereby to commence work under this contract, with adequate force and equipment, on a date to be specified in a written order of the Engineer, and shall fully complete all work there under within the following number of consecutive calendar days from and including that date:

(120) Consecutive Calendar Days

The Bidder declares that he understands that the unit price quantities shown in the Bid are subject to adjustment by either increase or decrease, and that should the quantities of any of the items of the work be increased, the undersigned proposes to do the additional work at the unit prices stated herein; and should the quantities be decreased, he also understands that payment will be made on actual quantities used at the unit price bid and will make no claim for anticipated profits for any decrease in the quantities and that quantities will be determined upon completion of the work at which time adjustment will be made to the contract amount by direct increase or decrease.

Submitted: _____

By: _____ (L.S)

Title: _____

General Contractor's License No. _____

(Note: If the Bidder is a Corporation, the Bid shall be signed by a duly authorized Officer of the Corporation; if a Partnership, it shall be signed by a Partner. If Signed by other, authority for signature shall be attached. The name of the person Signing must be typed in under his/her signature.)

for each consecutive, calendar day that the CONTRACTOR shall be in default of completing the Work within the time limit named herein. Because of the difficulty of fixing damages suffered by the OWNER on account of such default, damages are herein agreed upon as stated.

3. The OWNER hereby agrees to pay the CONTRACTOR for the faithful performance of this CONSTRUCTION AGREEMENT, subject to additions and deductions as provided in the Drawings and Specifications, together with the Bid, Advertisements for Bids, Instructions to the Bidders, Special Provisions, General Conditions, and all Addenda hereto annexed, in lawful money of the United States, the sum of:

(Dollars and Cents)

which sum shall also pay for all loss or damages arising out of the nature of the Work aforesaid, or from the action of the elements, or from unforeseen obstructions or difficulties encountered in the prosecuting of the Work, and for all expenses incurred by or in consequence of the Work, its suspension or discontinuance, and for well and faithfully completing the Work and the whole thereof, as herein provided, and for replacing defective Work, material, or equipment provided for a period of (one year) after completion of all Work.

4. No later than 30 days after pay requests are promptly and properly submitted, as the Work progresses, the OWNER shall make partial payments to the CONTRACTOR on the value of labor and materials incorporated into the Work and of materials on hand at the Site of the Work, except cement and other materials subject to deterioration, during the preceding calendar month, less payments already made and less deductions for any unaccepted or defective Work, in accordance with terms set forth in the Specifications.

5. Upon submission by the CONTRACTOR of evidence satisfactory to the OWNER that all payrolls, material bills, and other costs of any kind incurred by the CONTRACTOR in connection with the construction of the Work have been paid in full, final payment on account of this CONSTRUCTION AGREEMENT shall be made within thirty (30) days after the completion by the CONTRACTOR of all Work covered by this CONSTRUCTION AGREEMENT and the acceptance of such Work by the OWNER.

IN WITNESS WHEREOF, the parties hereto have caused this CONSTRUCTION AGREEMENT to be executed by their duly authorized officers as of the date first above written in four (4) counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original agreement. It is the intention of the parties that this Construction Agreement is a sealed instrument regardless of whether or not any seal is actually attached hereto.

Signed, Sealed, and Delivered in the Presence of: AIKEN COUNTY, SOUTH CAROLINA

Witnesses:

By: _____
Ronnie Young
County Council Chairman

ATTEST:

_____ (SEAL)
COUNTY CLERK (Official Seal)

Signed, Sealed and Delivered in the Presence of:

(Print or Type Name of CONTRACTOR)

Witnesses:

(As to the CONTRACTOR)

By: * _____

(Print or Type Name)

(Print or Type Name)

Its: _____

(As to the CONTRACTOR)

(Print or Type Name)

ATTEST:

* _____ (SEAL)

(Print or Type Name)

Its: _____
(Official Seal)

APPROVED AS TO FORM AND CONTENT

Attorney for the OWNER

* NOTE: SIGNING INSTRUCTIONS - THESE INSTRUCTIONS MUST BE FOLLOWED.
If CONTRACTOR is a Corporation, the CONSTRUCTION AGREEMENT must be signed by the President or Vice-President, Attested by the Secretary, and the Corporate Seal affixed.
If CONTRACTOR is a Partnership, the CONSTRUCTION AGREEMENT must be signed in the Partnership's Name by one of the Partners, with indication that (s)he is a General Partner.
Signatures must be legible with the printed or typed name under each appropriate signature.

IN WITNESS WHEREOF, the said CONTRACTOR has hereunder affixed his signature and said SURETY has hereunto caused to be affixed its corporate signature, and seal, by its attorney-in-fact, on this the ____ day of _____, 2016, executed in four (4) counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original.

Signed, Sealed, and Delivered in the Presence of:

(CONTRACTOR)

WITNESSES:
1. _____
(As to CONTRACTOR)

(Print or Type Name)

By: _____ L.S.

(Print or Type Name)

2. _____
(As to CONTRACTOR)

(Print or Type Name)

Title: _____

ATTEST:
By: _____

(Print or Type Name)

(SURETY)

WITNESSES:
1. _____
(As to SURETY)

(Print or Type Name)

By: _____ L.S.

(Print or Type Name)

2. _____
(As to SURETY)

(Print or Type Name)

TITLE: _____

ATTEST:
By: _____

(Print or Type Name)

TITLE: _____

(OFFICIAL SEAL)

APPROVED AS TO FORM

(Attorney for the OWNER)

* NOTE: If the Principal/Contractor is a Corporation, the Bond shall be signed by the President or a Vice-President, attested by the Secretary and the Corporate Seal Affixed. If the Principal/Contractor is a partnership, the Bond shall be signed in the Partnership Name by one of the Partners, with the indication that he is a General Partner. Signatures must be legible and typed in under the appropriate line. THESE INSTRUCTIONS MUST BE FOLLOWED.

IN WITNESS WHEREOF, the said CONTRACTOR has hereunder affixed his signature and said SURETY has hereunto caused to be affixed its corporate signature, and seal, by its attorney-in-fact, on this the ____ day of _____, 2016, executed in four (4) counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original.

Signed, Sealed, and Delivered in the Presence of:

(CONTRACTOR)

WITNESSES:
1. _____
(As to CONTRACTOR)

(Print or Type Name)

By: _____ L.S.

(Print or Type Name)

2. _____
(As to CONTRACTOR)

(Print or Type Name)

Title: _____
ATTEST:
By: _____

(Print or Type Name)

WITNESSES:
1. _____
(As to SURETY)

(Print or Type Name)

(SURETY)

By: _____ L.S.

(Print or Type Name)

2. _____
(As to SURETY)

(Print or Type Name)

TITLE: _____
ATTEST:
By: _____

(Print or Type Name)
TITLE: _____

(OFFICIAL SEAL)

APPROVED AS TO FORM

(Attorney for the OWNER)

* NOTE: If the Principal/Contractor is a Corporation, the Bond shall be signed by the President or a Vice-President, attested by the Secretary and the Corporate Seal Affixed. If the Principal/Contractor is a partnership, the Bond shall be signed in the Partnership Name by one of the Partners, with the indication that he is a General Partner. Signatures must be legible and typed in under the appropriate line. THESE INSTRUCTIONS MUST BE FOLLOWED.

PRECONSTRUCTION CONFERENCE

(Rev July 2013)

1.1 DESCRIPTION

To help clarify construction contract administration procedures, the County (Owner) will conduct a Preconstruction Conference prior to start of the work. Contractor(s) will designate personnel for attendance.

1.2 SUBMITTALS

- A. To the maximum extent practicable, advise the County Engineer at least 4 hours in advance of the Conference as to items to be added to the agenda.
- B. The Engineer will compile minutes of the Conference, and will furnish copies of the minutes to the Contractor. The Contractor may make and distribute such other copies as he wishes.

1.3 PRECONSTRUCTION CONFERENCE

- A. The Conference will be held after the Owner has issued the "Notice of Award", but prior to actual start of the work.

- B. Attendance:

Provide attendance by authorized representatives of the Contractor and major subcontractors. For those persons designated by the Contractor, his subcontractors, and suppliers to attend the Preconstruction Conference, provide required authority to commit the entities they represent to solutions agreed upon in the Conference.

- C. Minimum agenda: Data will be distributed and discussed on:
 - 1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers and the Engineer;
 - 2. Establish channels and procedures for communication;
 - 3. Construction schedule, including sequence of critical work;
 - 4. Contract documents, including distribution of required copies of drawings and revisions;
 - 5. Processing of Shop Drawings and other data submitted to the Engineer for review;
 - 6. Processing of field decisions and Change Orders;
 - 7. Rules and regulations governing performance of the Work; and
 - 8. Procedures for safety, security, quality control, traffic control, etc.

Also during the Conference, the project start date will be determined. After the end of the Conference, a "Notice to Proceed" will be issued to the Contractor.

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ROADWAY IMPROVEMENTS
TO
MOUNTAIN LAUREL DRIVE
Technical Specifications

SPECIFICATION REFERENCES

The "Standard Specifications for Highway Construction, Edition of 2007" as published by the South Carolina Department of Transportation shall govern the material and workmanship on this project and is incorporated within this Contract by reference, except where modified by the Specifications and the Special Provisions included within this section. In addition, the "Standard Drawings for Road Construction" published by the South Carolina Department of Transportation are incorporated within this Contract by reference.

1. GENERAL

1.1. MOBILIZATION (Pay Item No. 1)

1.1.1. DESCRIPTION: Mobilization consists of the preparatory operations including: moving personnel and equipment to the project site; paying bond and insurance premiums; establishing offices, buildings, and other facilities necessary for work on the project; and all other preparatory work or costs incurred before beginning work on the project.

1.1.2. MEASUREMENT AND PAYMENT: Mobilization is paid at the lump sum price bid, which price and payment is full compensation for organizing and moving all forces, supplies, equipment, and incidentals to the project site, regardless of the number of times such moves are made, and all preconstruction costs incurred after award of the Contract. The price and payment also includes costs for demobilization.

Payments for mobilization are included in the first and second construction estimates. Each payment is for one-half (1/2) of the lump sum price for Mobilization subject to the following limits:

- 1) Contract Amount less than \$100,000: The maximum payment in each of the first and second construction estimates is equal to 5% of the Contract Amount.
- 2) Contract Amount equal to or greater than \$100,000: The maximum payment in each of the first and second construction estimates is equal to 2.5% of the Contract Amount.

If there is a remaining amount of the lump sum price for mobilization after payments are made according to the limits stated above, then the remaining amount is paid after all work on the project has been completed and accepted.

Partial payment of this item in no way acts to preclude or limit any of the provisions of partial payments otherwise provided for by the Contract or these Specifications. Payment for this item includes all direct and indirect costs and expenses required to complete the work.

1.2. CONSTRUCTION STAKES, LINES, GRADES (Pay Item No. 2)

1.2.1. DESCRIPTION: This work shall consist of all labor and materials necessary to provide the layouts required to construct the elements of the project and accommodate all utility relocations. The owner will provide adequate reference points and bench marks as show on the Plans or as provided by the Engineer. Any additional control points set by the Owner will be identified in the field and documented in writing to the Contractor.

Provide field personnel and set all additional stakes for the project which are needed to establish offset stakes, reference points, and any other horizontal or vertical controls, including supplementary bench marks necessary to secure a correct layout of the work.

Ensure that all computations of survey work required in the execution of this project are performed by a Land Surveyor or Professional Engineer registered in South Carolina. Make certain that these computations are accompanied by the designated LS or PE seal and signature.

The Contractor is responsible for ensuring that the finished work substantially conforms to the lines, grades, elevations, and dimensions called for in the Plans or as provided by the Engineer. Any inspection or checking of the Contractor's layout by the Engineer and the acceptance of all or part of it does not relieve the Contractor of the responsibility to secure the proper dimensions, grades, and elevations of the several parts of the work. Exercise care in the preservations of stakes and benchmarks and have them reset at no additional expense when any are damaged, lost, displaced, or prematurely removed. Use competent personnel and suitable equipment for the layout work required.

The Engineer may make random checks of the Contractor's staking to determine if the work is in substantial conformance with the Plans. Where the Contractor's work ties into work that is being done or will be done by others, checks will be made to determine if the work is in conformance with the proposed overall grade and alignment.

If during the course of staking or construction work unforeseen utilities, and/or field conditions arise, which conflict with construction as shown in the Plans, notify the Engineer immediately. The Engineer will review the Contractor's findings and adjust the lines and grades accordingly or assist the Owner in arranging for the utility to relocate its facilities. The resulting adjustments will be provided to the Contractor so that its survey crew can adjust the staking. Adjusted staking as described above is considered a normal consequence of construction. No additional compensation is due to the Contractor for this work or for any delays due to adjustments to the staking.

1.2.2. MEASUREMENT AND PAYMENT: Construction Stakes, Lines, Grades will not be measured for payment, but will paid as a Lump Sum item distributed as a proportion of the amount of relevant work completed and accepted by the Engineer. In no case will the sum of all payments for this item exceed the total bid amount for Construction, Lines, & Grades, which payment is full compensation for all material, labor, equipment, tools, supplies, transportation, and incidental work, including computations necessary to satisfactorily complete the work. The payment includes all direct and indirect costs and expenses required to complete the work.

1.3. TRAFFIC CONTROL (INCLUDES CONSTRUCTION SIGNAGE ((TEMPORARY AND PERMANENT)) (Pay Item No. 3)

1.3.1. DESCRIPTION: This work shall consist of all labor and material necessary to safely manage traffic, **both vehicular and pedestrian**, on, along, or through the work area. This Item sets forth the traffic control requirements necessary for the safe and continuous maintenance of traffic throughout the area affected by the work. The temporary and permanent construction signage shall conform to SC Department of Transportation as defined in SCDOT 2007 *Standard Specifications for Highway Construction* Including but not limited to Sections 602.2.3 and 605.4.

1.3.2. MATERIALS: All materials shall be chosen from the current Qualified Products List of the SC Department of Transportation and adhere to the requirements of the latest edition of the *FHWA Manual on Uniform Traffic Control Devices (MUTCD)*.

1.3.3. INSTALLATION AND MAINTENANCE: All traffic control devices and methods used shall conform to the Manual on Uniform Traffic Control Devices (MUTCD), latest edition. Contractor shall take all necessary precautions for the protection of the work area and safety of the public at all times. Signs and barricades shall be new or in like-new condition. Signs that become faded, illegible, or damaged shall be replaced as directed by the Engineer. The Contractor shall take all steps necessary to ensure that all equipment, materials and work zones are secured from access by the general public. The Contractor shall coordinate the closure of work areas to the general public with the Owner as described in Subsection 1.1.12. Appropriate traffic control devices and other required safety appurtenances shall be erected prior to the commencement of any work and shall be maintained at each work location until all operations are complete. All salvaged material and devices, i.e. signs, barricades, safety fences, etc., shall become the property of the Contractor. Weeds, shrubbery, construction equipment or material, spoil, etc., shall not be allowed to obscure any traffic control device. Upon removal of signs and other safety appurtenances, Contractor is to restore all disturbed areas, sod or pavement, to its original condition. All personnel on the project site shall comply with Federal OSHA regulations. At a minimum, all personnel shall wear reflective safety vests within any work zone.

1.3.4. MEASUREMENT AND PAYMENT: Traffic Control and Construction Signage will not be measured for payment, but will be paid as a Lump Sum item distributed proportionately to each month's pay request. Any discrepancies from the Contract Plans, Specifications, and/or the MUTCD will be documented and provided to the Contractor for resolution. Any discrepancies not resolved by the Contractor may constitute a corresponding reduction of payment. Payment will be full compensation for all labor and materials necessary to manage traffic and provide for the public safety including, but not limited to, flagmen, signs, temporary pavement markings, lights, water, barricades, security fences and furnishing, placing, replacing, repairing, restoring, and moving traffic control devices and safety appurtenances necessary for the fulfillment of the contract requirements.

2. EARTHWORK

2.1. CLEARING AND GRUBBING WITHIN ROADWAY, DRAINAGE EASEMENT AND CONSTRUCTION LIMITS (*Pay Item No. 4*)

2.1.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for clearing and grubbing of all vegetation, debris, and obstructions within the limits of the roadway, right of way, ditch and channel areas, or other easement areas, except for such objects that are designated to remain, or are to be otherwise removed in accordance with the plans or other sections of these specifications.

2.1.2. EQUIPMENT: Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the Engineer as to both type and condition before commencement of work.

2.1.3. CONSTRUCTION: Contractor shall clear and grub all areas as shown on the plans where new construction is taking place.

Additionally, selective clearing as directed by the Engineer may be required in order to complete work described in other subsections of these Specifications. Work in areas that are to be selectively cleared shall consist of removing vegetation, brush, stumps, etc. from the area. Special care shall be taken in these areas to avoid damage to trees that are to remain. Grubbing may not be required in some areas designated for selective clearing.

The Contractor must obtain approval from the Engineer prior to the removal of any tree larger than 8" in caliper unless designated as to be removed on the Plans. Trees that are to remain in place will need to be protected as necessary from damage due to the work being performed in the vicinity.

All trees that are to be removed are to be felled in such a way as to avoid damage to any other tree or feature that is 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 deemed undesirable by the Engineer may be selectively removed as directed.

Stumps and roots larger than two (2) inches in diameter shall be completely removed by grubbing except in areas of building or foundation construction or paving operations. Stumps and roots in these areas are to be cut off no less than 18 inches below the subgrade. The area of operation then shall be cleared of resulting debris and roots, weeds, and other organic matter shall be completely removed from the site and properly disposed of.

2.1.4. MEASUREMENT AND PAYMENT: The pay item Clearing and Grubbing within Roadway, Drainage Easement and Construction Limits is measured by the area cleared and grubbed in acres (AC). Payment will be made for the relevant work at each project site after it is complete and accepted by the Engineer. Payment is determined using the contract unit price bid. Payment is full compensation for performing the clearing and grubbing work as specified or directed and includes proper removal and disposal of timber and debris and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.

2.2. UNCLASSIFIED EXCAVATION (*Pay Item No. 5*)

2.2.1. DESCRIPTION: Unclassified Excavation consists of the work required to cut, fill, excavate, backfill, compact and grade as necessary to construct the site to the lines and grades as directed or as shown in the Drawings. All excavation performed under this section is considered unclassified except for items specifically described in other items of these Specifications, and excavation of every description, regardless of the materials encountered or the manner in which they are removed, shall be performed to the lines and grades indicated. This work may include, but is not limited to, muck excavation, stripping and stockpiling of materials to be reused, surplus material not required or desired to be used in the project, watercourse and drainage ditch excavation, rock excavation, excavation of existing pavement less than two (2) inches in total thickness, and borrow

excavation unless otherwise provided. When the item Unclassified Excavation is included in the Contract, the bid quantity is only an estimate. It is the Contractor's responsibility to inspect the site and determine the actual amount of unclassified excavation needed to complete the project.

2.2.2. MATERIALS:

2.2.2.1. GENERAL: 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. 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.

Provide suitable material free from organic matter and deleterious substances, containing no rocks or lumps over 6" in greatest dimension, and with not more than 15% of the rocks or lumps larger than 2-1/2" in their greatest dimension. Do not permit rocks having a dimension greater than 1" in the upper 6" of fill or embankment.

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.

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" in diameter. 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.

2.2.2.2. TOPSOIL: Use topsoil consisting of material removed from the top 3" to 6" of existing on-site soils. Use topsoil containing no stones, roots or large clods of soil. Stockpile topsoil separate from other excavated material. Borrowed topsoil shall adhere to the requirements of SCDOT 2007 *Standard Specifications for Highway Construction* Section 209.2.

2.2.3. EQUIPMENT: Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the Engineer as to both type and condition before commencement of work.

2.2.4. CONSTRUCTION:

2.2.4.1. EXAMINATION: Verify that survey bench mark and intended elevations for the Work are as indicated. Surface Conditions: 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.

2.2.4.2. PREPARATION: Identify required lines, levels, contours, and datum. Stake and flag locations of known

utilities. Locate, identify, and protect utilities that remain, from damage. Notify utility company to remove and relocate utilities. Clearing and grubbing: Clear and grub areas to be graded prior to commencement of the grading operations. Where so directed by the Engineer and Owner, protect and leave standing designated desirable trees. Complete any demolition and/or removal work as may be required prior to grading operations. 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.

Topsoil: Strip topsoil to a depth of 3" to 6" without contamination from the subsoil and stockpile topsoil separate from other excavated materials. 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. Deposit topsoil in areas that are already graded and will not be disturbed by on-going construction. Dispose of unsuitable or unusable stripped material off-site or as otherwise directed by the Engineer.

Sampling and preliminary testing: Prior to beginning the grading operations, the Contractor shall submit to the Engineer his proposed sequence of excavation operations. 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). Allow sufficient time for completion of laboratory tests before any fill operations begin, using the soils being tested.

2.2.4.3. ROUGH GRADING:

Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content. When excavating through roots, perform work by hand and cut roots with sharp axe. Perform excavating of every type of material encountered within the limits of the Work to the lines, grades and elevations indicated and specified herein.

Suitable excavated materials: 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. 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.

Unsuitable excavated material: Remove from the site and dispose of all unsuitable material unless otherwise approved by the Engineer.

Rock excavation: Notify the Engineer upon encountering rock or similar material which cannot be removed or excavated by conventional earth moving or ripping equipment. Do not use explosives without written permission from the Engineer. When explosives

are permitted, use only experienced powdermen or persons who are licensed or otherwise authorized to use explosives. Store, handle and use explosives in strict accordance with all regulatory bodies and the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc. The Contractor shall be solely responsible for any damage resulting from the use of explosives. The Contractor is responsible for securing all permits required in performing this work.

Unauthorized excavation: Excavation of material to depths below the grades indicated unless so directed by the Engineer will be deemed unauthorized excavation. Unauthorized overexcavation shall be backfilled and compacted without any additional expense to the Owner. 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 expense by the Owner.

Filling and Backfilling: Use fills formed of suitable material placed in layers of not more than 8" in depth measured loose and rolled and/or vibrated with suitable equipment until compacted. Do not place rock that will not pass through a 6-inch diameter ring within the top 12-inch of the surface of the completed fill or rock that will not pass through a 3-inch diameter ring within the top 6-inches of the completed fill. Do not use broken concrete or asphaltic pavement in fills.

Selection of borrow material: 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.

Placing and compacting: Place backfill and fill materials in layers not more than 8" in loose depth. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of maximum density for the area. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice. Place backfill and fill materials evenly adjacent to structures, to required elevations. 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.

Moisture control: Do not use soil material that is either too dry or too wet to achieve proper compaction. 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. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density. 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 disking, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the Engineer.

Compaction requirements: Compact soils to not less than the following percentages of

maximum dry density as determined in accordance with ASTM D698, Method A (Standard Proctor).

Fill beneath structures and beneath an area extending 10 feet beyond the limits of the foundation:

Top 12-inches of Subgrade 100%

All other fill material 98%

Beneath Roadways:

Top 12-inches of Subgrade 100%

All other fill material 98%

Embankments:

Top 12-inches of Subgrade 98%

All other fill material 95%

Beneath Non-Vehicular Pavements:

Top 12-inches of Subgrade 98%

All other fill material 90%

Lawns and unpaved areas:

All other fill material 95%

Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

2.2.4.4. SOIL REMOVAL

Stockpile excavated topsoil on site. Stockpile subsoil to be re-used on site; remove remainder from site. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

2.2.4.5. FINISH GRADING

Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas. Smooth the finished surfaces within specified tolerance. Grade with uniform levels or slopes between points where elevations are shown on the drawings, or between such points and existing grades. Where a change of slope is indicated on the drawings, construct a rolled transition section having a minimum radius of approximately 8 feet, unless adjacent construction will not permit such a transition, or if such a transition defeats positive control of drainage. Before Finish Grading, verify subgrade has been contoured and compacted. Remove debris, roots, branches, and stones in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

Grading adjacent to structures: Grade areas adjacent to buildings to achieve drainage away from the structures and to prevent ponding.

Ditches and gutters and swales: Cut accurately to the cross sections, grades and elevations shown. Maintain excavations free from detrimental quantities of leaves, sticks, trash and other debris until completion of the work. Dispose of excavated

materials as specified herein; do not in any case deposit materials within 3'0" of the edge of a ditch.

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. Where topsoil is to be placed, scarify surface to depth of 3 inches (75 mm). In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches (75 mm). Place topsoil in areas where seeding are indicated. Place topsoil to the following compacted thicknesses: Areas to be seeded with grass not less than: 4 inches (75 mm). Place topsoil during dry weather. Remove roots, weeds, rocks, and foreign material while spreading topsoil. Near plants spread topsoil manually to prevent damage. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade. Lightly compact placed topsoil. Any surplus topsoil materials shall be disposed of in approved areas on the site.

2.2.4.6. SHOULDERS AND SLOPES

Selected material for shoulders or slopes consists of a friable material such as topsoil, etc. containing grass roots and having the properties of being in comparatively porous, capable of growing grass, and of a stable nature in that when compacted resists erosion and is capable of supporting vehicles when relatively wet.

Shape, trim and compact the shoulders and slopes in proper sequence for the type of base or surfacing being constructed. For graded aggregate base and asphalt surface courses, perform the shoulder work prior to or during the construction of these courses or as soon thereafter as directed by the Engineer. Perform this work so that the shoulders, adjacent ditches and slopes are adequately drained at all times.

Maintain the shoulders, slopes and other designated areas by preserving, protecting, replacing and doing such other work as may be necessary to keep the work in satisfactory condition until the project is accepted.

2.2.4.7. CLEAN EXISTING DITCH

Remove trash, debris and accumulated sediment that has been deposited in existing storm drainage ditches and swales within the project limits that are to be retained as shown on the Plans or as directed by the Engineer in order to maintain positive drainage.

Dispose of excavated materials as specified herein; do not in any case deposit materials within 3'0" of the edge of a ditch. Maintain excavated ditches free from detrimental quantities of leaves, sticks, trash, sediment and other debris until completion of the work.

Cleaned and excavated existing ditches shall be stabilized as prescribed within these Specifications. The costs of maintaining and stabilizing the cleaned and excavated existing ditches shall be included within the lump sum unit price bid and will not be included in pay items not explicitly assigned to this work.

2.2.4.8. TOLERANCES

Top Surface of Subgrade: Plus or minus 1/10 foot (30 mm) from required elevation.
Top Surface of Finish Grade: Plus or minus 1/2 inch (13 mm). Construct areas outside of building or structure lines true to grades shown. Where no grade is indicated, shape finish surface to drain away from buildings or structures, as approved by the Engineer.
Degree of finish shall be that ordinarily obtainable from bladegrader, supplemented with hand raking and finishing.

2.2.4.9. FIELD QUALITY CONTROL

Secure the Engineer's construction observation and approval of subgrades and fill layers before subsequent construction is permitted thereon. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor"), ASTM D 1557 ("modified Proctor"), or AASHTO T 180. If tests indicate work does not meet specified requirements, remove work, replace and retest.

Frequency of Tests:

- 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,
- In each compacted fill layer, one field density test for every 5000 sq.ft. of overlying paved area, but not less than three tests,
- In fill beneath structures, one field density test for every 2500 sq.ft. in each layer,
- Other tests as deemed necessary by the Engineer.

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: 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. 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.

Proofrolling: The Contractor shall proofroll subgrade of areas to receive paving, structures on fill or impervious lining material. Make no less than 3 passes of a 25 to 50 ton rubber tired roller over the full area. Unstable, soft or otherwise unsuitable materials revealed by the proofrolling shall be removed and replaced with satisfactory materials and compacted as specified herein.

2.2.4.10. DEWATERING

Remove all surface and subsurface waters from excavations and maintain the excavation in a dry condition during construction operations. Maintain the water level below the excavation subgrade during excavation and construction. 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. Use sumps, pumps, drains, trenching or well point system as necessary to maintain a dry excavation. 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. Dispose of water pumped from excavations in storm drains having capacity, canals, trenches or other approved locations. Contractor is responsible for acquiring all permits required to discharge the water and shall protect waterways from turbidity during the operation. Prevent flooding of streets, roadways, or private property. Provide engines driving dewatering pumps with residential type mufflers.

2.2.4.11. CLEANING AND PROTECTION

Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water. Leave site clean and raked, ready to receive landscaping.

Existing utilities:

- 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.
- 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.
- 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.
- If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.
- Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.

Protection of persons and property:

- Barricade open holes and depressions occurring as part of this Work, and post warning lights on property adjacent to or with public access.
- Operate warning lights during hours from dusk to dawn each day and as otherwise required.
- 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.

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. Maintain access to adjacent areas at all times. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

2.2.4.12. MAINTENANCE

Protection of newly graded areas: Protect newly graded areas from traffic and erosion, and keep free from trash and weeds. Repair and re-establish grades in settled, eroded and rutted areas to the specified tolerances. 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.

2.2.5. MEASUREMENT AND PAYMENT:

2.2.5.1. Unclassified Excavation

The quantity for the pay item Unclassified Excavation is the volume of material excavated as prescribed and is measured by the cubic yard (CY). The quantity includes the material acceptably excavated and is measured in its original position and determined from cross-sections by the method of average-end-area, complete and accepted. The measurement includes overbreakage or removal of slides not attributed to carelessness or negligence of the Contractor, authorized excavation of rock, unsuitable materials, or unstable materials below grade and the excavation necessary to replace such materials, excavation of selected materials required by the Engineer to be stockpiled and reserved for later use in the project, and material obtained from borrow pits.

Where the plan quantity of Unclassified Excavation is computed from cross-sections included in the Plans, no field measurement is needed unless an error in the Plans or calculations is found, there are different site conditions, or a revision to the work is required. Revisions to the computed plan quantity and estimated quantities not determined from cross-sections included in the Plans are computed from cross-section data taken in the field.

Payment for the accepted quantity of the pay item Unclassified Excavation is determined using the contract unit bid price per square yard (CY) and includes all direct and indirect costs and expenses necessary to perform the work as specified or directed herein. Payment is full compensation for performing the earthwork prescribed and includes all of the work required to cut, fill, excavate, backfill, compact and grade as necessary to construct the site to the lines and grades as directed or as shown in the Plans.

3. Sub grade Course- Shape and Compact (To Include Testing Every 800 LF) (Pay Item No. 7)

3.1. Description

3.1.1. This section contains specifications for the materials, equipment, construction, measurement, and payment for the construction and preparation of the subgrade intended to receive the pavement structure, sidewalk, curb, curb and gutter, and shoulders.

3.2. Materials

3.2.1. None specified.

3.3. Equipment

3.3.1. Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the RCE as to both type and condition before the start of work under this section. Provide sufficient equipment to enable prosecution of the work in

accordance with the project schedule and completion of the work in the specified time.

3.4. Construction

3.4.1. General

3.4.2. Remove all soft, unstable, or unsuitable material that does not compact readily. Replace this material with satisfactory material as directed by the RCE. Remove or break off all objectionable loose rock or boulders to a depth of not less than 6 inches below the surface of the subgrade. Fill all holes, ruts, or depressions that develop in the subgrade with approved material, bring the subgrade to line and grade, and properly compact. Perform this work without any additional compensation. If the subgrade is too dry to compact properly, sprinkle with water to wet it, if deemed desirable by the RCE, to secure proper compaction.

3.4.3. Compact the subgrade between lines 18 inches outside the area occupied by the pavement structure, including curb and gutter and sidewalk as applicable, to not less than 100% Standard Proctor. Accomplish the compaction by using suitable construction procedures while the subgrade is at suitable moisture content. Maximum densities are determined by either SC-T-25 (Method A or C as applicable) or SC-T-29.

3.4.4. On projects where the base and pavement are constructed under a later contract, compact the subgrade as specified above to not less than 100% standard proctor.

3.4.5. When any portion of the subgrade is constructed on an old roadbed that conforms to or approximates the elevation of the subgrade, scarify and grade the existing surface as directed by the RCE so that the subgrade has a uniform density when compacted.

3.5. Protection and Maintenance

3.5.1. Maintain the subgrade in a smooth and fully compacted condition, free from ruts and depressions, and adequately drained. Storing or stockpiling of materials directly on the subgrade is not permitted without the prior approval of the RCE. Never, under any circumstances, place any base, surface course or pavement before the subgrade is checked and approved by the RCE.

- 3.5.2. Never, under any circumstances, place any base, surface course, or pavement on frozen, muddy, or unstable subgrade.

3.6. Fine Grading

- 3.6.1. After all earthwork is substantially complete and all drains and structures completed and backfilled and the subgrade compacted to the satisfaction of the DCE, make certain that the subgrade conforms to the lines, grades and cross-sections shown on the Plans or as established by the RCE.
- 3.6.2. Ordinarily the costs necessary to complete fine grading of the subgrade are included in other items of work. Typically, these costs are included in excavation items or other items that may be subject to increases or decreases from the plan quantities as field conditions dictate. In order to alleviate this issue, an item, Fine Grading, has been established and may be included in the Contract at the discretion of the Department.
- 3.6.3. Fine Grading is defined as the work necessary to bring the in-place earth material into the final shape and compacted condition prescribed in the Contract documents. The area considered for Fine Grading is the area described in Structures (Roadway) as specified in SCDOT "Standard Specifications for Highway Construction, Edition of 2007" Subsection 208.4.1 or approved equal, which extends laterally 18 inches beyond the pavement structure.

3.7. Measurement

- 3.7.1. The quantity for the pay item Fine Grading is the surface area of the subgrade that is constructed and prepared for the intended pavement structure, sidewalk, and shoulders and is measured by the square yard (SY), complete, and accepted.
- 3.7.2. If the pay item Fine Grading is not included in the Contract, the grading work is not measured for payment directly and is considered included in contract unit bid price of the various other items of work.

3.8. Payment

- 3.8.1. Payment for the accepted quantity for Fine Grading, is measured in Square Yards (SY), and is determined using the contract unit bid price for the pay item. Payment is full compensation for grading and forming the subgrade as specified or directed and includes all materials, labor, equipment, tools,

supplies, transportation, and incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.

3.8.2. Payment for this item includes all direct and indirect costs and expenses necessary to complete the work.

4. Moving Items: Mailboxes, street Signs, Etc. to R/W Line or Designated Area

4.1.1. (MOVING ITEMS) (pay item #6)

4.1.1.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for the removal and relocation of mailboxes, street signs, ect. within the limits of improvement to the Right of Way line, and if necessary, storing it in a careful manner and resetting or rebuilding it in conformity with the Plans and the Specifications or as directed by the RCE.

4.1.2. MATERIALS: Unless otherwise specified or directed by the RCE, use materials from the original items and, when necessary, furnish new materials to restore the items to their originals condition. If new items are required for reconstruction, but items of the same type are not available, use equivalent items.

4.1.3. EQUIPMENT:

4.1.3.1. Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the RCE as to both type and condition before the start of work under this section. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.

4.1.4. CONSTRUCITON:

4.1.4.1. Remove and replace all moving items at the location designated on the Plans or by the RCE. Ensure that the items are left in the same or better condition than it was before removal.

4.1.5. MEASUREMENT AND PAYMENT:

4.1.5.1. The quantity for the pay item Moving Items: Mailboxes, Street Signs, Etc. to R/W Line or Designated Area is to me measured as a Lump Sum.

Payment for the accepted quantity of Moving Items: Mailboxes, Street Signs, Etc. to R/W Line or Designated Area is determined to be a Lump Sum. Payment is full compensation for the removal and relocation of mailboxes, street signs, ect. within the limits of improvement to the Right of Way line, and if necessary, storing it in a careful manner and resetting or rebuilding it in conformity with the Plans and the Specifications or as directed by the RCE. This includes incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.

Payment for each item includes all direct and indirect costs or expenses required to complete the work.

5. **GRADED AGGREGATE BASE COURSE**

4" GRADED AGGREGATE BASE –(PAY ITEM NO. 8)

PAVING WITHIN SCDOT ROW (INCLUDES 2" TYPE C ASPHALT INTERMEDIATE COURSE, AND 6" GABC BASE COURSE)- (PAY ITEM NO. 11)

5.1.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for construction of a base course composed of the graded aggregate materials specified herein on a properly prepared foundation (sub-grade or sub-base) in conformance with the lines, grades, dimensions, and cross-sections shown on the Plans or as directed by the Engineer.

5.1.2. MATERIALS: Use graded aggregate base material such as Macadam Base, Marine Limestone Base, Recycled Portland Cement Concrete Base, or other graded aggregate base that conforms to the requirements of the SC Department of Transportation as defined in SCDOT 2007 *Standard Specifications for Highway Construction* Section 305.4.

For Asphalt Prime Coat, use EA-P Special for priming the base course conforming to the requirements of SCDOT 2007 *Standard Specifications for Highway Construction* Section 407.2.4 paragraph 2.

5.1.3. EQUIPMENT: Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the Engineer as to both type and condition before commencement of work. Use sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.

Use a steel wheel roller capable of developing a pressure of 250 to 350 pounds per inch of roller width in the compressions wheel for compaction. If necessary, use other rollers in conjunction with the steel wheel roller. Acceptable additional rollers are self-propelled or tractor drawn pneumatic tired rollers or vibratory rollers. Use a combination of the above rollers as necessary to produce a finished product which complies with these Specifications.

5.1.4. CONSTRUCTION:

5.1.4.1. PREPARATION OF SUBGRADE

Construct the foundation for the base course in accordance with the requirements as specified in Section 2.3. Proofroll all areas to receive crushed stone paving; make not less than three passes over the full area, using a 35 to 50 ton rubber tired roller. Remove all soft, unstable or unsuitable material that will not compact readily to full depth of unsuitable material, or to a depth of 30 inches, whichever is less, and replace with satisfactory materials. Fill all holes, ruts or depressions which develop in the subgrade with approved on-site material, bringing subgrade to indicated line and grades. Roll and compact the subgrade for at least 500 feet ahead of the placing of base course materials where feasible. Construct

shoulders in accordance with the requirements of Subsection 2.3.4.6 and related, accurately trimmed to the alignment and grade of the base course to form a trench or channelized section as prescribed in the Plans.

5.1.4.2. PLACING OF BASE COURSE MATERIAL

- 5.1.4.2.1. Place the base course aggregate on the prepared foundation. Perform the spreading so that the finished base course conforms to the lines, grades, dimensions and the typical cross-sections shown on the Plans or as directed by the Engineer.
- 5.1.4.2.2. When the required compacted thickness is 10 inches or less, construct the base course in one layer. Where the required compacted thickness is more than 10 inches, construct the base course in two or more layers of approximately equal thickness, and ensure that the maximum compacted thickness of any one layer does not exceed 10 inches. Construct and compact each layer as specified before placing the succeeding layer.
- 5.1.4.2.3. Take care to prevent segregation of the fines from the coarse aggregates during handling, spreading and shaping of the materials, and correct all areas of segregation before subsequent placement of overlying lifts.
- 5.1.4.2.4. If the foundation becomes unstable after the base course has been placed, repair the section by removing the base course material and unsatisfactory foundation material, replace the foundation material and reconstruct the foundation as described in these Specifications, and replace the base material at the required cross-section, grade and compaction.

5.1.4.3. COMPACTION, ROLLING AND FINISHING

- 5.1.4.3.1. After the base course material is spread, continually machine it with motor graders or other suitable equipment and maintain the required section until the base course is thoroughly compacted. Compact each layer by the use of equipment specified in Subsection 3.1.3. If the foundation becomes unstable after the base course has been placed, repair the section by removing the base course material and unsatisfactory foundation material, replace the foundation material and reconstruct the foundation as described in these Specifications, and replace the base material at the required cross-section, grade and compaction.
- 5.1.4.3.2. Start rolling the base course at the edge and proceed toward the center, except on superelevated curves where rolling operations proceed from the lower to the upper side. On areas not accessible for the operation of standard rollers, perform compaction using Engineer approved rollers. Continue rolling until the layer is satisfactorily compacted for the full width and depth. Wet the base course when necessary. Extend rolling over the edges of each layer of base course materials for a distance of two (2) feet on the shoulders. Continue blading and rolling until a dense, smooth, unyielding, and well-bonded base course is obtained.

- 5.1.4.3.3. If initial compaction has been performed and the voids are not filled, place fine aggregate on the base course in an amount only sufficient to fill the voids. Broom, wet and roll the base course until the coarse aggregate is firmly set bonded, and the base course is thoroughly compacted for the full width and depth. Continue the rolling until the entire base course is compact to not less than 98% of maximum dry density as determined in accordance with ASTM D698, Method A (Standard Proctor). Determine the in-place density and moisture content of the graded aggregate base course with a nuclear moisture-density gauge or by other approved means.
- 5.1.4.3.4. On shoulder work or other applicable construction, do not use steel wheel rollers on finished pavements, except at locations necessary for turning around. During all phases of work take extreme care to protect structures.

5.1.4.4. SURFACE SMOOTHNESS: Ensure that the finished surface of the base course varies neither more than 3/8 inch from a straight edge 10 feet long when applied parallel to the centerline of the road, nor more than 1/2 inch from the typical cross-section shown on the Plans. Provide necessary materials and perform such corrective work to repair any deviations exceeding the limits given without additional compensation.

5.1.4.5. THICKNESS TOLERANCE OF BASE COURSE

- 5.1.4.5.1. The thickness of the completed base course is measured at staggered intervals not to exceed 250 feet. Depth measurements are made by test holes through the base course. Where the base course is less than the specified thickness by more than 1/2 inch, correct such areas by scarifying, adding base course material, and re-compacting as directed by the Engineer.
- 5.1.4.5.2. When the base course is paid for on a square yard basis, any measurement that exceeds the specified thickness by more than 1/2 inch is considered as the specified thickness plus 1/2 inch. The average job thickness is the average of the depth measurements. When the average job thickness is less than the specified thickness by more than 1/4 inch and payment is by the square yard, an adjusted unit price is used for calculating payment. This adjusted unit price bears the same ratio to the contract unit price bid as the average job thickness bears to the specified thickness. No additional payment over the contract unit price is made for any base course where the average job thickness, determined as provided, exceeds the specified thickness.

5.1.4.6. APPLICATION OF PRIME COAT (Pay Item No. 9)

- 5.1.4.6.1. When hot mix asphalt or an asphalt surface treatment is specified as the subsequent layer on a Graded Aggregate Base Course, apply a prime coat to the base course in accordance with this Specification. Before applying the prime coat, repair all irregularities in the base course and ensure that the base course has seasoned sufficiently to permit a uniform penetration and that the

Engineer has approved the density of the base course. Clean the base course of all mud, dirt, dust, and caked or loose material of any description by brooming, blowing, or other methods to expose the coarse aggregate in the base course.

- 5.1.4.6.2. When, in the opinion of the Engineer, the asphalt material used to prime coat the base course may present a hazard to adjacent properties, the Engineer may opt to delete the prime coat from a section of paving.
- 5.1.4.6.3. Ensure that the rate of application of the prime coat material conforms to the following application rates:

Application Rate in Gallons per Square Yard of Asphalt (gal/yd²)

	<u>Min.</u>	<u>Max.</u>
<u>Macadam Base Course</u>	0.25	0.30
<u>Marine Limestone Base Course</u>	0.10	0.15
Recycled Portland Cement		
<u>Concrete Base Course</u>	0.25	0.30

- 5.1.4.6.4. Allow base course to season sufficiently to permit uniform penetration. Do not apply to wet surfaces or when the temperature is below 60⁰F in the shade and falling, or below 55⁰F in the shade and rising. Apply prime material using pneumatic mounted distributors at the appropriate rate specified above. Permit no traffic on primed surfaces until bituminous material has penetrated and dried sufficiently that it does not pick-up under traffic. Maintain the prime coat and surface of the base course intact until it has been covered by superimposed construction. Place the asphalt surface course within seven (7) days of the base course being primed.

5.1.4.7. MAINTENANCE: Machine the base course as often as is necessary to maintain it smooth and true to grade and cross-section and apply water as required to prevent raveling and keep the base course tightly bound until the prime coat is applied. Repair any defects or damage that develops.

5.1.5. MEASUREMENT AND PAYMENT:

The quantity for the pay item Graded Aggregate Base Course, of the required uniform thickness is the surface area of the base constructed as specified and measured by the Square Yard (SY) of base course in-place, complete and accepted. The area of base course constructed outside the area designated is disregarded in computing the quantity.

Payment for the accepted quantity of Graded Aggregate Base Course is determined using the contract unit price per SY (Square Yard). Payment is full compensation for constructing the graded aggregate base course as specified or directed and includes preparing the foundation, furnishing, hauling, placing, spreading, mixing, adding water, shaping compacting, finishing, applying prime coat, maintenance, reconstruction (if necessary) of

the base course, and all other materials, labor, equipment, tools, supplies, maintenance, and incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.

The quantity for Asphalt Prime Coat will be measured by in square yards.

The payment for Asphalt Prime Coat will be determined using the contract unit price per Square Yard (SY). Payment is full compensation for constructing the asphalt prime coat as specified or directed and includes placing, spreading, curing, mixing, hauling and all other materials, labor, equipment, tools, supplies, maintenance, and incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.

Payment for each item includes all direct and indirect costs or expenses required to complete the work.

6. ASPHALT PAVING

1.5" Minimum Compacted Hot Laid Asphalt Concrete Surface Course, SCDOT Type C (Includes the Cost of Coring Every 800 LF) (Pay Item No. 10)

PAVING WITHIN SCDOT ROW (INCLUDES 2" TYPE C ASPHALT INTERMEDIATE COURSE, AND 6" GABC BASE COURSE)- (PAY ITEM NO. 11)

CUL-DE-SAC RAISED EDGE – 2 Foot Wide (Pay Item No. 12)

DRIVEWAY PAVING to ROW (Pay Item No. 13)

6.1.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for HMA intermediate and surface courses of the Type designated and composed of mineral aggregate and binder, mixed in an approved plant, constructed on a prepared surface, and in conformance with the lines, grades, dimensions, thickness, and typical cross-section shown on the Plans or as otherwise specified.

6.1.2. MATERIALS: Obtain materials from the same source throughout the duration of the project. Use materials and suppliers chosen from the current Qualified Products List of the SC Department of Transportation where applicable. Ensure that the materials and composition of mixture meet the requirements of SCDOT Surface Course Type C as defined in SCDOT 2007 *Standard Specifications for Highway Construction* Section 401 and **Supplemental Technical Specification SC-M-402.**

6.1.3. EQUIPMENT: Ensure that the equipment used meets the requirements of SCDOT Surface Course Type C and Intermediate Course Type C as defined in SCDOT 2007 *Standard Specifications for Highway Construction* Section 401.

6.1.4. CONSTRUCTION: 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. Sweep primed surfaces if needed.

Install work in accordance with SCDOT 2007 *Standard Specifications for Highway Construction* Section 401. Prior to laying any HMA on existing or unsealed asphalt surfaces, uniformly apply a tack coat by use of the distributor spray bar at the rate of 0.05 to 0.15 gallons per square yard as described in SCDOT 2007 *Standard Specifications for Highway Construction* Section 401.4.18. Place asphalt surface course within seven (7) days of applying primer or tack coat. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

To ensure the finished surface is free from ponding, flood the entire paved area with water by use of a tank truck or hoses. 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. Feather and smooth the edges of fill so that the joint between fill and original surface is invisible. Ensure that the finished surface of the surface course varies no more than 1/4 inch from the typical cross-section shown on the Plans. Provide necessary materials and perform such corrective work to repair any deviations exceeding the limits given without additional compensation.

Protect the new finished surface from traffic until the mixture has hardened sufficiently to prevent deformation.

- 6.1.5. MEASUREMENT AND PAYMENT:** The quantity for HMA Surface Course, of the type specified and at the required uniform thickness is the surface area of the pavement constructed as specified is measured by the square yard (SY) of HMA course in-place, complete and accepted. The area of pavement constructed outside the area designated is disregarded in computing the quantity. The quantity for Liquid Asphalt Binder is considered incidental to the construction of the HMA Course specified and will not be measured for payment. The costs associated with the Liquid Binder should be included in the contract unit price bid for each HMA Course.

HMA course of variable thickness or HMA course of thickness for which there is no unit bid price bid is converted to square yards of equivalent area of a base course of a thickness for which there is a contract unit bid price. The conversion is based on the HMA course whose thickness is nearest to that of the HMA course without a unit price.

Payment for the accepted quantity of HMA Surface Course and HMA Intermediate Course of the type specified will be paid for at the contract unit price bid. **No** adjustment of the contract unit price will be made due to fluctuations in the Monthly Asphalt Price Index or the Monthly Fuel Price Index. Payment for the accepted quantity of HMA Surface Course is full compensation for all costs, direct and indirect, associated with the furnishing, mixing, hauling, placing, compacting and finishing of the surface course and includes all materials

required in the mixture including tack coat, aggregates, binder, admixtures and other additives.

The quantity for Driveway Paving is measured as each (EA) driveway constructed with the specified dimensions and materials, in place where shown on the Plans and where directed by the Engineer, complete and accepted. This item includes the base course and HMA course(s) as shown on the Plans. Materials and construction specified for the paving of driveways shall be in accordance with the relevant sections of this Specification. Payment for the accepted quantity of Driveway Paving will be paid for at the contract unit price bid and is full compensation for all costs, direct and indirect, associated with the driveway paving including grading, subgrade preparation, base course and HMA courses, labor, equipment, tools, supplies, maintenance, and incidentals necessary to complete the work in accordance with the Plans. No additional compensation will be made for the paving of driveways under these Specifications.

The quantity for Paving Within SCDOT Right-of-Way is measured by the square yard (SY) of HMA course in-place, complete and accepted, and constructed with the specified dimensions and materials, in place where shown on the Plans and where directed by the Engineer. This item includes the base course and HMA course(s) as shown on the Plans. Materials and construction specified for this paving shall be in accordance with the relevant sections of this Specification and the provisions of the approved Encroachment Permit for this project. Payment for the accepted quantity of Paving Within SCDOT Right-of-Way will be paid for at the contract unit price bid, and is full compensation for all costs, direct and indirect, associated with this paving including grading, subgrade preparation, base course and HMA courses, labor, equipment, tools, supplies, maintenance, and incidentals necessary to complete the work in accordance with the Plans. No additional compensation will be made for paving within SCDOT rights-of-way under these Specifications.

The quantity for Paving the Cul-De-Sac Raised Edge -2 Foot Wide is measure in Linear Feet (LF). HMA course in-place, complete and accepted, and constructed with the specified dimensions and materials, in place where shown on the Plans and where directed by the Engineer. This item includes the base course and HMA course(s) as shown on the Plans. Materials and construction specified for this paving shall be in accordance with the relevant sections of this Specification and the provisions of the approved Encroachment Permit for this project. Payment for the accepted quantity of Paving Within SCDOT Right-of-Way will be paid for at the contract unit price bid, and is full compensation for all costs, direct and indirect, associated with this paving including grading, subgrade preparation, base course and HMA courses, labor, equipment, tools, supplies, maintenance, and incidentals necessary to complete the work in accordance with the Plans. No additional compensation will be made for paving within SCDOT rights-of-way under these Specifications.

7. STORM DRAINAGE
18" REINFORCED CONCRETE PIPE (Class III) (Pay Item No. 14)

24" REINFORCED CONCRETE PIPE (Class III) (Pay Item No. 15)

7.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for the furnishing and placement of reinforced concrete pipe culverts of the size, shape and class specified in conformity with the Plans and the Specifications or as directed by the Engineer.

7.1.1. MATERIALS:

7.1.1.1. Provide RC pipe, joint sealant and other materials that meet or exceed the requirements of SCDOT Supplemental Technical Specification Designation SC-M-714 from suppliers chosen from the current Qualified Products List of the SC Department of Transportation.

7.1.1.2. When a strength class is not specified, use minimum Class III pipe. Furnish pipe in manufactured lengths of 4 to 12 feet.

7.1.1.3. Use Rubber Gasket Joint Material meeting the requirements of AASHTO M 315 or Preformed Flexible Joint Sealant meeting the requirements of AASHTO M 198.

7.1.1.4. When lift holes or lugs are required in pipe, follow OSHA guidelines for handling pipe and manufacturer guidelines for plugging lift holes after installation. Use tees, wyes, elbows, bends, reducers and increasers with strength matching or exceeding the strength of the strongest pipe being connected and with joint profiles that match connected pipe.

7.1.2. EQUIPMENT: Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the Engineer as to both type and condition before commencement of work. Use sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.

7.1.3. CONSTRUCTION:

7.1.3.1. Handling and Storage:

7.1.3.1.1. Inspect pipe before it is installed. Check pipe for proper markings and for signs of damage due to fabrication or shipment.

7.1.3.1.2. Pipe may be rejected due to improper marking, incorrect pipe class, size, or strength.

7.1.3.1.3. Pipe may also be rejected due to damage which may include, but is not limited to fractures or cracks passing through the wall or extending the entire length of the pipe, spalling, chips, breaks, or honeycombing that would adversely affect the strength or function of the pipe.

7.1.3.1.4. Damage to the end of the pipe including broken tongues or grooves or ends that are not normal to the walls or centerline of the pipe that prevent satisfactory joint installation may also be cause for rejection.

7.1.3.1.4.1. Defective or damaged joint sealant or gaskets may require replacement, but are not cause for rejection of pipe that meets the above requirements.

7.1.3.1.4.2. Handle and store pipe such that no damage occurs to the pipe. Unload the pipe at a site that is relatively flat and level, free of debris, and away from construction traffic. Stack belled pipes using blocking to avoid excess loading on the bells.

7.1.3.2. Trench for Pipe:

7.1.3.2.1. Lay the pipe in a trench where possible. Excavate trenches to the required grade and to a width sufficient to allow for proper jointing of the pipe and for

thorough compaction of the structural backfill material under and around the pipe. Excavate the trench to a width which is the greatest of:

1. 1.5 x Pipe O.D. + 12"
 2. Pipe O.D. + 24"
 3. 3 x Pipe O.D. (only in sections where foundation improvement is required in the plans or by the Engineer)
 4. The width required to safely fit compaction equipment and personnel between the pipe and the trench walls.
- 7.1.3.2.2. When using controlled low strength material (CLSM) backfill, excavate the trench to a minimum width of the outside diameter of the pipe plus 12 inches. Make certain that the trench bottom gives full support to the pipe throughout its length.
- 7.1.3.2.3. Where pipe culvert will be placed in new embankments, first construct the embankments to a height of approximately $1/2$ the diameter of the pipe above the top of the designated pipe or to such height as directed by the RCE. Construct the embankment for a distance of not less than 5 times the diameter of the pipe on each side of the pipe location, after which excavate the trench in the embankment as described in this section above.
- 7.1.3.2.4. When excavating for pipe culvert, if rock, hard pan, or other unyielding foundation material is encountered, excavate the hard unyielding material below the elevation of the bottom of the pipe to accommodate the required bedding thickness.
- 7.1.3.2.5. Follow OSHA's excavation regulations found in Subpart P of 29 CFR 1926 for safety requirements of trench excavations and protection systems. The Contractor shall employ an onsite Competent Person (as defined by SC OSHA as follows: one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. In order to be a competent person for the purpose of this standard one must have had specific training in, and be knowledgeable about, soils analysis, the use of protective systems, and the requirements of this standard) during all trenching operations. Provide the Engineer with the name and contact information of the responsible Competent Person for each installation. If trench widths or wall slopes are changed due to safety requirements, backfill the trench outside of the vertical trench dimensions with materials meeting the minimum requirements of the embankment (or pipe structural backfill for shallow installations) as described herein. Ensure that the support of the pipe and its embedment are maintained throughout the installation.
- 7.1.3.2.6. If trench boxes (shields, etc.) are required, follow 29 CFR 1926.652, trench box manufacturer, and industry standards for trench installations not exceeding 20 feet. When trench boxes are required for trenches exceeding 20 feet deep, the Contractor shall submit to the Engineer designs, plans

and supporting calculations for protective systems and shoring equipment sealed by a Professional Engineer who is licensed in South Carolina unless provided in the plans. When trench boxes are moved, the previously placed pipe and structural backfill shall not be disturbed. Move trench box in increments during the installation process to permit placement and compaction of structural backfill material for the full width of the trench while continuing to follow Subpart P of 29 CFR 1926 OSHA Standards. Voids that are created by movement of the trench box shall be filled and compacted with structural backfill described herein. If necessary to prevent movement, restrain the pipe using methods that do not damage the pipe.

- 7.1.3.2.7. If temporary shoring (sheet pile, timber shoring, mechanically stabilized earth, etc.) is required, the Contractor shall submit to the Engineer designs, plans and supporting calculations for protective systems and shoring equipment sealed by a Professional Engineer who is licensed in South Carolina unless provided in the plans. If temporary shoring is to be removed, it shall be pulled out in vertical increments during the installation process to permit placement and compaction of fill material for the full width of the trench while continuing to follow Subpart P of 29 CFR 1926 OSHA Standards. If temporary shoring is to be left in place, provide the Engineer with location and description of all buried systems for inclusion in as-built plans.
- 7.1.3.2.8. Provide for temporary diversion of water or pumping as may be necessary in order to permit dry installation of the culvert. Keep trenches free from water until any joint sealant material has hardened sufficiently.

7.1.3.3. Foundation for Pipe:

- 7.1.3.3.1. Unless noted otherwise in the plans or by the Engineer, support pipe using foundation material that meets the minimum requirements of the roadway embankment.
- 7.1.3.3.2. When an improved foundation is required, remove unstable material at least 1 diameter on each side of the pipe. Excavate deep enough to install nonwoven geotextile for drainage filtration and pipe foundation material as indicated on SCOOT Standard Drawings. If Type P1 biaxial geogrid is used with the foundation material and geotextile for drainage filtration, the additional foundation undercut may be reduced as indicated on SCOOT Standard Drawings. When pipe foundation material is indicated, use the same material that is used for the bedding and pipe structural backfill. Compact the pipe foundation material in accordance with methods used for pipe structural backfill. Provide trench suitable to accommodate site conditions and obstructions.
- 7.1.3.3.3. If poor material is encountered that was not indicated in the plans, contact the Engineer for instructions on foundation preparation.

7.1.3.4. Bed for Pipe:

- 7.1.3.4.1. For bedding material, use either:
 1. Well graded A-1 (AASHTO M 145) soils
 2. Screenings meeting A-1 (AASHTO M 145)
 3. Macadam or Marine Limestone Graded aggregate base
 4. Uniformly graded, coarse grained A-3 (AASHTO M 145) soils (Class 1 wrapped)
 5. Uniformly graded angular stone as large as #5 stone (Class 2 wrapped, vibrated)
- 7.1.3.4.2. The same material must be used for bedding and structural backfill unless CLSM is used for structural backfill.
- 7.1.3.4.3. The materials marked as (wrapped) require geotextile wrap to control migration of fines into open voids. In all cases, use a geotextile that prevents the transmission of the smallest soil particles present in both the in-situ soil and the soil used for bedding and structural backfill. Wrap the entire bedding and backfill envelope and provide a minimum overlap of 2 feet at all geotextile splices. For shallow installations, provide a cover of 6 inches of soil between geotextile and hot mix asphalt.
- 7.1.3.4.4. A sample of the pipe bedding material will be taken at the beginning of pipe laying operations to verify the classification of materials used for bedding and pipe structural backfill. After the initial sample is taken, the sampling frequency will be for each 1,000 foot production lot or until the source or classification of the bedding/backfill material changes. These are requirements that may be increased or decreased at the Engineer's discretion.
- 7.1.3.4.5. Ensure that trenches are free of water when placing bedding.
- 7.1.3.4.6. Support the pipe by placing uncompacted bedding material above the stable foundation material. Use the larger of 6 inches or 10.0% of the nominal pipe outside diameter for the bedding thickness. Prepare bedding material at pipe bells and projected hubs (if present) to prevent excess loading and to provide uniform support in these areas.
- 7.1.3.4.7. Compact bedding material that is outside of the middle third pipe diameter in order to ensure proper support of the pipe. Ensure that bedding material outside the middle third of pipe is compacted to a minimum of 95.0% of the maximum dry density. Ensure that compaction of bedding material does not cause the pipe to move.
- 7.1.3.4.8. Vibrate angular stone in place using a minimum of 2 passes with a vibratory plate tamp in lifts not to exceed 12 inches.
- 7.1.3.4.9. Do not use Controlled Low Strength Material (CLSM), flowable fills or concrete for pipe Bedding.

7.1.3.5. Laying of Pipe:

- 7.1.3.5.1. Begin laying pipe at the downstream end of the culvert with the bell or groove ends and outside laps upstream.
- 7.1.3.5.2. Make certain each section of pipe has a full firm bearing throughout its length, true to line and grade given. Make certain that all supports are uniform (without point loading from irregular backfill) and that bells have been properly accommodated. Remove pipe that settles before final acceptance or which is not in alignment and re-lay without extra compensation.
- 7.1.3.5.3. When custom pipe with noncircular reinforcement is used, install the pipe in such a position that the manufacturer's marks designating the top of the pipe is not more than 5 degrees from the vertical plane through the longitudinal axis of the pipe or manufacturers guidelines, whichever is most vertical.
- 7.1.3.5.4. Before laying the pipe or during the pipe laying operations, construct adequate outfall ditches and inlets free of obstructions in order that proper drainage is provided.
- 7.1.3.5.5. When pipes are connected to drainage structures, install or cut pipe flush with inside face of drainage structure. When pipes are connected to end treatments such as slabs or headwalls, install or cut pipe flush with exposed face of end treatment. When pipe culverts are installed connecting to pipe of different material or connection details, use a standard drainage structure or designed interface as directed by the Engineer. Where pipe culverts are constructed in conjunction with existing structures, make connections to the satisfaction of the Engineer.

7.1.3.6. Joints:

- 7.1.3.6.1. Use a joint material supplied with the pipe and made by a manufacturer listed on the latest edition of the SCOOT Qualified Product List that corresponds with the type of joint specified in the plans or provided by the pipe manufacturer. Submit joint material manufacturer installation recommendations to Engineer before installation of pipe if conflicting with the Plans or Specifications. Follow joint material manufacturer's recommendations for installation procedure. Follow pipe manufacturer's recommendations for maximum joint opening to meet tightness requirements specified in the plans or contract documents. Order pipe and appropriate joint material from pipe manufacturer. Install pipe using AASHTO M 198 joints unless specified in the plans, contract documents, or pay items.
- 7.1.3.6.2. AASHTO M 198 Preformed Flexible Joint Sealant:
 - a) Use a combination of pipe and joint material that meets performance requirements of the AASHTO M 198, including the laboratory 10 psi pressure test. The laboratory test (which may be performed using vertical joints as indicated in AASHTO) is not intended to indicate field

performance of the joint, but rather to indicate the proper sealant size to joint detail configuration as well as performance of the joint under ideal laboratory conditions.

- b) Carefully clean all dirt and foreign substances from the jointing surface of the groove end already laid and tongue end of the pipe being added. Allow jointing surfaces to dry completely before application of the joint material.
- c) If required by site conditions or manufacturer recommendations, apply an adhesive primer specified by the flexible sealant manufacturer. During cold weather, warm flexible sealant as directed by the manufacturer before application. Apply material in a single strip as specified by pipe manufacturer (typically from within 1 inch of the tongue end to approximately the middle of the tongue on pipe) for up to 48 inch diameter pipe. For pipe larger than 48 inch diameter, place half of the sealant on the top side of the tongue end and the other half on the bottom side of the groove end of the two pipes being joined.
- d) Provide between 1" and 3" overlap of the installed joint sealant by laying the edges of the sealant side by side. Do not twist ends of sealant around each other or stack one end on top of the other. Leave protective paper on outside of flexible sealant to protect during pipe alignment. Apply enough flexible sealant to fill the annular joint space.
- e) Align the tongue and groove or bell and spigot ends of the pipes before joining (closing) the joint. Remove any remaining protective paper from outside surface of flexible sealant.
- f) Make sure that the flexible sealant is in contact with the entry taper around the entire circumference of the pipe. Confirm that the pipe is aligned properly. Seat the pipe completely before installing next pipe section.

7.1.3.6.3. AASHTO M 315 Rubber Gasket Joint Material:

- a) When specified in the plans, use a combination of pipe and joint material that meets performance requirements of the AASHTO M 315 (ASTM C 443), including the laboratory 13 psi pressure test. The laboratory test is not intended to indicate field performance of the joint, but rather to indicate the proper gasket size to joint detail configuration as well as performance of the joint under ideal laboratory conditions.
- b) Carefully clean all dirt and foreign substances from the jointing surface of the groove end already laid and tongue end of the pipe being added.
- c) Follow pipe manufacturer's recommendations for lubrication of joint and/or gasket. Fit the gasket on the tongue recess.

- d) Equalize the rubber gasket by running a smooth round object (such as a screwdriver shaft) between the gasket and the pipe. Complete this equalization procedure at least 3 times around the entire length of each gasket (see detail on standard drawing for reinforced concrete pipe). Ensure proper seating of the gasket before proceeding with installation.
- e) Align the tongue and groove ends of the pipes before homing (closing) the joint. Make sure that the gasket is in contact with the entry taper around the entire circumference and that the pipe is aligned properly.
- f) Seat pipe completely before installing next pipe section.

7.1.3.7. Pipe Structural Backfill:

- 7.1.3.7.1. Advise the Engineer of the time Pipe Structural Backfill operations are expected to begin. If not properly advised, the Engineer may require the excavation and reinstallation of the structural backfill material.
- 7.1.3.7.2. For structural backfill, use the same material as the pipe bedding unless controlled low strength material is used as described below. When materials are used that require geotextile wrap, cover the entire bedding and structural backfill envelope as described herein.
- 7.1.3.7.3. Controlled Low Strength Material (CLSM) and controlled density fill are flowable fills that may be used for structural backfill in the haunch area and above. Select a flowable fill mix design that can be excavated. When using CLSM backfill excavate the trench to a width that is a minimum of the outside pipe diameter plus 12 inches but no wider than the outside pipe diameter plus 20 inches. Do not use CLSM when placing perforated pipe. When using CLSM ensure that the pipe is not displaced and does not float while using methods that do not damage the pipe.
- 7.1.3.7.4. Ensure that trenches are free of water when placing and compacting structural backfill.
- 7.1.3.7.5. Thoroughly compact the structural backfill material in layers not exceeding 6 inches of compacted material. The first lift must be sufficiently below the spring line such that the material can be worked into the haunch zone of the pipe. Perform compaction by the use of mechanical tampers with the assistance of hand tamps when necessary. Thoroughly compact the structural backfill under the haunches of the pipe and ensure that the backfill soil is in continuous uniform contact with the side and joints of the pipe. Exercise sufficient care to prevent damaging or misaligning the pipe with the compaction equipment.
- 7.1.3.7.6. Install and compact structural backfill on both sides of pipe before adding the next lift of backfill material. Evenly distribute structural backfill on both sides of the pipe for its full length. Ensure that the Pipe Structural Backfill process does not cause joint separation or displacement of the installed pipe.

- 7.1.3.7.7. Ensure that the compaction of structural backfill is a minimum of 95.0% of the maximum dry density.
- 7.1.3.7.8. For pipe smaller than 36 inches in diameter, the Engineer may run a verification compaction test at the springline of the pipe for each run of pipe between drainage structures or pipe ends. For pipe 36 inches in diameter and larger, the Engineer may run one test for each 18 inches of the pipe embedment zone height (including one at the pipe springline) for each run of pipe between drainage structures or pipe ends will be performed. This frequency may be increased or decreased at the Engineer's discretion.
- 7.1.3.7.9. For all tests, insert the nuclear gauge probe to its full depth or within 2 to 3 inches of the bottom of the layer being tested, whichever is less. In the event of a non-conforming compaction measurement, The Engineer will check the compaction of the previous lift by removing enough material to perform the verification test. If the second test passes, the Contractor will continue the compaction efforts of the current layer until the verification test passes. In the event of 2 failing compaction tests within a single run of pipe (between drainage structures or pipe ends), remove the pipe structural backfill, clean trench and set a new compaction pattern at the Engineer's discretion.
- 7.1.3.7.10. Vibrate angular stone backfills in place using methods that properly lock the angular stone in place around the pipe and do not damage the pipe, typically 2 passes with a vibratory plate tamp for each 12 inch lift.
- 7.1.3.7.11. Complete structural backfill installation up to the minimum cover elevation above the pipe for typical installations. When installing pipe under pavement and within 3 feet of the subgrade, complete structural backfill installation up to the top of the subgrade. Confirm that structural backfill material in pipe trench meets or exceeds the embankment compaction requirements before applying pavement structure.

7.1.3.8. Cover Height: Ensure that the minimum and maximum cover is in accordance with the height of cover tables in the SCOOT Standard Drawings unless otherwise specified in the Plans or these Specifications.

7.1.3.9. Construction Loads: Fill height requirements may dictate that more fill is required during construction than for final design. In all cases, install backfill to the minimum construction fill height specified in the SCOOT Standard Drawings before driving heavy equipment over pipe. Maintain this minimum cover until heavy equipment usage is discontinued so that damage does not occur to the pipe. Install and remove backfill required due to the construction loading on the pipe at no expense to the Owner. Repair all damage or displacement at no expense to Owner.

7.1.3.10. Structures and End Treatments:

- 7.1.3.10.1. When not included in the plans, follow SCOOT Standard Drawings for connections of pipe to drainage structures, manholes, end treatments, or other buried structures.
- 7.1.3.10.2. Construct end treatment at each exposed end of pipe in conformance with the Plans and Specifications.
- 7.1.3.10.3. When specified in the plans, use end treatments such as pipe beveled end, concrete slab, straight headwall for pipe, pipe end structure, or pipe wingwall and apron system in accordance with SCOOT Standard Drawings or Plan structure details.

7.1.3.11. Installation Inspection:

- 7.1.3.11.1. All traffic control necessary to perform the installation and post construction inspections will be provided by the Contractor. No separate payment will be made for this traffic control.
- 7.1.3.11.2. Construction Inspection: Visually inspect 100% of pipe for fractures, cracks, spalling, chips, and breaks during all phases of the installation process. Inspect joints, including tongues and grooves. Chipped pipe ends that prevent the full bond between joint sealant or gasket and both pipes may only be installed in drainage structures at the ends of pipe runs where they will be grouted over. Inspect installed joints for missing, damaged, or improperly installed joint sealant or gasket. Verify line and grade conforms to the Plans. All inspections must be performed by a SCDOT certified Earthwork, Drainage and Base Technician. When improper installation or damage is noted during the construction inspection of the pipe, repairs must be made to the satisfaction of the Engineer. Additional inspections may be performed until confidence is restored that the installation has been performed in accordance with these Specifications.
- 7.1.3.11.3. Post Construction Inspection (Acceptance):
 - a) The Contractor will collect survey data for 100% of installed pipe. Survey data will be collected electronically to establish a pipe inventory. Survey data will include latitude, longitude, station, offset, elevation, and coordinates of the flow line for each pipe end. Survey data collected will also include at a minimum pipe diameter, pipe material, and description or survey data for drainage structures and end treatments.
 - b) The Contractor and the Engineer will inspect 100% of pipe under the roadbed, 100% of pipe in a closed drainage system, and a minimum of 10.0% (random locations) of all other locations. These inspections will be performed to ensure proper jointing, clear flow, and that line, grade, and deformations (if applicable) do not exceed allowable limits.

- c) These inspections will be performed by an SCDOT certified Earthwork, Drainage and Base Technician. Inspections of completed pipe installations will be performed after the embankment is in place and all non-asphalt bases and/or subgrades have been completed for at least 30 days. In cases where the Contractor's accepted CPM Schedule indicates that paving operations will be conducted in less than 30 days, an early inspection may be performed for acceptance. If early inspections are performed and the paving does not commence as scheduled, an additional inspection may be performed at the Owner's discretion.
- d) When third party surveys and inspections are performed on behalf of the Contractor, a report will be submitted with the survey and inspection results. This report will include pipe location identification, equipment used for inspection, inspector name, inspector field notes, measurements from the pipe inspection (at a minimum to include the following: deviation from design grade, deviation from line, deflection (expressed in inches and % of pipe diameter)), and survey data for all installed pipe. When improper installation or damage is noted in any prior inspection (visual, compaction, installation, etc.) of the pipe, repair the pipe installation to the satisfaction of the Engineer. The Engineer may perform additional inspections until confidence is restored that the remaining pipe has been installed in accordance with these specifications and is performing satisfactorily. For concrete pipe, when signs of distress, such as differential movement, efflorescence, spalling, rust stains or cracks wider than 0.01 inch are present in the pipe, prepare a report for submittal to the Engineer. This report must address: structural integrity, environmental conditions, design service life of the pipe, and recommended remediation. The Engineer must accept both the remediation report and recommended repair procedure. At a minimum, seal cracks having widths equal to or greater than 0.01 inch and considered to be detrimental by the Engineer in accordance with manufacturer's instructions. Replace pipes having cracks greater than 0.1 inch determined to be beyond satisfactory structural repair. Repair or replace pipes having displacement across the crack. Repair or replace pipes exhibiting spalls or delaminations.

7.1.3.12. Cleaning Out Pipe: Thoroughly clean out the entire length of newly installed pipe culverts. No additional payment will be made for the cleaning out of newly

installed pipe culverts. Pipes must be clean and accessible for inspection and acceptance.

7.1.4. MEASUREMENT AND PAYMENT: The payment for all Reinforced Concrete Pipe will be full compensation for all removal and disposal of the existing pipe, applicable excavation, sheeting, shoring, dewatering, hauling, invert paving, storing, rehandling of material, removal and disposal of excess and unsuitable material, tamped fill, forming bed or foundation, backfill, compaction and for all material, labor, equipment, tools, and incidentals necessary to complete the work. Newly installed pipe will be measured complete in place and paid for at the Contract unit price per lineal foot (LF). Installed pipe will not be paid for until a satisfactory inspection of said pipe has been performed in accordance with the Construction Inspection as outlined herein.

8. RIP RAP

8.1. RIP RAP (CLASS B) (Pay Item No. 16)

8.1.1.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for the construction of the protective layer of broken stone for slope protection in conformity with the Plans and the Specifications or as directed by the Engineer.

8.1.1.2. MATERIALS: Provide hard quarry stone or fieldstone that does not disintegrate on exposure to water or weathering. Ensure that stone has a sodium sulfate content less than or equal to 15% as tested in accordance with AASHTO T 104. Use stone that is suitable in all respects for the purpose intended and obtained from a source listed on the most recent edition of *SCDOT Qualified Product List*.

For pipe end and slope protection, use Class B Riprap conforming to the following gradation:

Rock Size (Feet)	Rock Size (Lbs.)	% of Rip Rap Smaller Than
1.33	200	100
1.0	75	85
0.75	37	50
0.42	5	10

8.1.1.3. CONSTRUCTION: See Section 4.2.2.4 below.

8.1.1.4. MEASUREMENT AND PAYMENT: The quantity for the pay item Riprap (of the class specified) is indicated in the Contract as the area of riprap placed, measured by the square yard (SY) parallel to the slope complete, and accepted by the Engineer. Payment for Riprap (of the class required) is made at the contract unit price bid and is full compensation for furnishing and placing riprap protection as specified or directed and includes preparing slopes, excavating the footing trench; and all other materials, labor, equipment, tools, supplies, transportation, and

incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract, except for the geotextile fabric under the riprap, which is paid for as a separate item.

8.1.2. GEOTEXTILE/ EROSION CONTROL UNDER RIPRAP (CLASS II, TYPE B) (Pay Item No. 17)

8.1.2.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for the construction of the protective layer of broken stone for slope protection in conformity with the Plans and the Specifications or as directed by the Engineer.

8.1.2.2. MATERIALS: Provide an engineered fabric capable of reducing soil erosion. Use fabrics appearing on the most recent edition of *SCDOT Qualified Product List*. Submit the manufacturer’s literature concerning the proposed product and proof of satisfactory performance to the Engineer before use.

For Geotextile Fabric for Erosion Control Under Riprap, provide Class 2, Type B geotextiles that conform to the following physical requirements:

Grab Strength	200 lbs.	ASTM D 4632
Seam Strength (Value applies to both field and manufactured seams. Sew seams upward for inspection.)	180 lbs.	ASTM D 4632
Puncture Strength	80 lbs.	ASTM D 4833
Burst Strength	250 psi	ASTM D 3786
Trapezoid Tear Strength	80 lbs.	ASTM D 4533
Elongation at Failure	15% Maximum	ASTM D 4632
Ultraviolet Degradation (500 hrs)	50% Strength Retained	ASTM D 4355
AOS	≥ No. 40 Std. Sieve	ASTM D 4751
Permittivity	≥ 0.2 per sec	ASTM D 4491

8.1.2.3. EQUIPMENT: Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the Engineer as to both type and condition before the start of work under this section. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.

8.1.2.4. CONSTRUCTION:

- 8.1.2.4.1. Shape and grade the slope or area on which riprap is placed to the lines, grades, thickness, or typical sections shown on the Plans or as directed by the Engineer. Install a fabric as specified on the Plans. Place geotextile fabric for slope protection in accordance with the Plans or as directed by the Engineer. Place the fabric on a slope that conforms to the Plans and in a relatively smooth condition free from obstructions, debris, or sharp objects that could puncture the fabric. Do not operate construction equipment directly on the fabric. Place fabric with the long dimension parallel to the toe of the slope and lay smooth and free of tension, stress, folds, wrinkles, or creases. If more than one strip is necessary, overlap the strips a minimum of 18 inches. Place transverse laps with the upstream strip overlapping the downstream strip. Place horizontal laps with the lower strip overlapping the upper strip. Laps may be eliminated if the joint is sewn using an approved method. Install approved fastener pins through both strips of overlapped fabric at no less than 5-foot intervals along a line through the midpoint of the overlap and at any other locations as necessary to prevent any slippage of the fabric. When placing material on the fabric, limit the height of the drop in order to prevent damage to the fabric. Demonstrate to the satisfaction of the Engineer that the placement technique prevents damage to the fabric. Begin placement of the material at the toe of the slope and proceed upward. Repair or replace any fabric damaged during installation or during placement of filter materials, slope protection, or other materials. Remove and replace extensively damaged fabric as directed by the Engineer. Repair individual isolated cuts, tears, or punctures by placing a patch of geotextile fabric over the damaged areas. Extend patch at least 18 inches beyond the damage in all directions or fasten the entire perimeter of the patch by a sewing method approved by the Engineer. Cover the fabric with the specified material before damage or deterioration from ultraviolet light occurs. Remove and replace fabric not covered within 30 calendar days after placement. If damage or deterioration is evident before 30 days after placement, as determined by the Engineer, remove and replace the fabric.
- 8.1.2.4.2. If indicated by the Plans or directed by the Engineer, place a layer of sand over the fabric to prevent puncture by large size riprap. Place riprap to the thickness equal to the maximum stone diameter or the thickness specified in the Plans, whichever is greater. Place riprap either mechanically or by hand in a manner such that the larger stones are well distributed, and the entire mass of stone conforms to the specified gradation. Place riprap with the percentage of voids is as small as practical. Place riprap to its full thickness in one operation and in a manner that avoids displacing the underlying material. Hand place or re-arrange individual stones by mechanical equipment to the extent necessary to secure the results specified. Place the stone by dumping such that the smaller stone is

uniformly distributed throughout the mass. Place stone to the required thickness on approved slopes at locations designated on the Plans or at other locations designated by the Engineer.

8.1.2.5. MEASUREMENT AND PAYMENT: The quantity of Geotextile for Erosion Control Under Riprap (of the class and type specified) is the surface area covered by the geotextile in-place, measured by the square yard (SY) parallel to the slope, complete, and accepted by the Engineer. Payment for the accepted quantity is determined using the contract unit bid price includes all direct and indirect costs and expenses necessary to complete the work. Payment for Geotextile for Erosion Control Under Riprap (of the type and class required) is full compensation for furnishing and placing geotextile under riprap as specified or directed and includes providing sand or granular filter layer and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

9. INCIDENTAL CONSTRUCTION

9.1. WHITE 24" STOPR BAR – THERMO-125ML (Pay Item No. 18)

- 9.1.1. DESCRIPTION:** This section contains specifications for the materials, equipment, construction, measurement, and payment for furnishing and applying permanent thermoplastic pavement markings within the limits of the project.
- 9.1.2. MATERIALS:** Use materials meeting the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 627.2.
- 9.1.3. EQUIPMENT:** Use equipment meeting the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 627.3.
- 9.1.4. CONSTRUCTION:** Construction shall meet the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 627.4.
- 9.1.5. MEASUREMENT AND PAYMENT:** The quantities for thermoplastic pavement markings for lines are measured by the linear foot (LF) along the center of the pavement marking lines for each type of line, width, color, and dry thickness of pavement marking line in-place, complete and accepted. Measurement is made of the pavement marking only and excludes the spaces between broken lines.

- 9.1.6. Traffic control utilized during the performance of pavement marking work is not measured under items covered by this section, but included in the item Traffic Control in accordance with these Specifications. Unless included elsewhere in this Contract, the work required to remove existing pavement markings is considered incidental and is not measured for payment.
- 9.1.7. Payment for the accepted quantity for each type of thermoplastic pavement markings is determined with the contract unit bid price for the applicable item. Payment is full compensation for applying pavement markings as specified or directed and includes preparing the pavement surface, removing unacceptable pavement markings, and all other materials, labor, equipment supplies and incidentals necessary to complete the work.

9.2. PERMANENT RAISED YELLOW PAVEMENT BI-DIRECTIONAL MARKERS (4"x4") – EVERY 80 LF (Pay Item No. 19)

- 9.2.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for furnishing and installing durable, abrasion-resistant retroreflective pavement markers (RPM) in conformance with the Plans or as directed by the Engineer and the protection of the RPM during installation.
- 9.2.2. MATERIALS: Use materials meeting the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 630.2.
- 9.2.3. EQUIPMENT: Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the Engineer as to both type and condition before the start of work under this section. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.
- 9.2.4. CONSTRUCTION: Install the RPMs in accordance with the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 630.4.
- 9.2.5. MEASUREMENT AND PAYMENT: The quantity for RPMs is measured by each (EA) RPM installed in place and accepted by the Engineer. Traffic control utilized during the performance of this work is not measured for payment,

but is included in the item Traffic Control as described elsewhere in these Specifications. The work required to remove existing RPMs is considered incidental to this item unless specified elsewhere in the Contract. Payment for the accepted quantity for RPMs is determined using the unit price bid and is full compensation for the direct and indirect costs of the work required.

9.3. PERMANENT ROADWAY SIGNS (Pay Item No. 20)

- 9.3.1. DESCRIPTION:** This section contains specifications for the materials, equipment, construction, measurement, and payment for the fabrication and installation of flat sheet signs in conformance with the Plans, Specifications, MUTCD, or as directed by the Engineer and for U-section posts supporting the signs. Road Name signs will be provided and installed by the Owner and are not covered under this Specification.
- 9.3.2. MATERIALS:** Use materials meeting the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 651.2 and 653.2.
- 9.3.3. EQUIPMENT:** Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the Engineer as to both type and condition before the start of work under this section. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.
- 9.3.4. CONSTRUCTION:** Fabricate and erect new road signs according to the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 651.4 and 653.4.
- 9.3.5. MEASUREMENT AND PAYMENT:** The quantity for this item is measured by each (EA) new permanent roadway sign installed in place and accepted by the Engineer. The work required to remove existing signs is considered incidental to this item. Payment for the accepted quantity for Permanent Roadway Signs is determined using the unit price bid and is full compensation for the direct and indirect costs of the work required and includes fabricating and erecting the signs and posts, and providing mounting hardware, and supports.

10. SEDIMENT AND EROSION CONTROL

EROSION CONTROL MAINTENANCE (INCLUDES TEMPORARY SEEDING AND SILT FENCE) (Pay Item No. 21)

SILT FENCE (Pay Item No. 22)

SEDIMENT TUBES (Pay Item No. 23)

TEMPORARY EROSION CONTROL BLANKET (CLASS B) (Pay Item No. 24)

STABILIZED CONSTRUCTION ENTRANCE (Pay Item No. 25)

PERMANENT COVER (Pay Item No. 26)

10.1. DESCRIPTION: This section contains specifications for the materials, equipment, construction, measurement, and payment for the placement of temporary erosion control measures, as well as permanent stabilization of the site through seeding, to prevent erosion and water pollution through the use of best management practices (BMPs) including the use of silt fences, rock check dams, sediment tubes, temporary seeding and stabilized construction entrances as well as permanent seeding and sodding in conformity with the Plans, the Specifications, the NPDES Permit and OS-SWPPP, SCDHEC Best Management Practices, or as directed by the Engineer. Prior to any land disturbing activities, the Contractor shall submit an Erosion Control Plan (ECP) to the Engineer for approval that will serve as the plan for temporary erosion control throughout the project. The Contractor shall 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 to conform to South Carolina Department of Health and Environmental Control regulations.

10.2. INSPECTIONS: All sediment and erosion control devices shall be inspected once every calendar week by responsible staff that has been specifically trained and certified to inspect and evaluate the effectiveness of SCDHEC Best Management Practices (BMPs). If periodic inspection or other information indicates that existing BMPs require maintenance, need to be modified, or if additional BMPs are necessary to comply with SC 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 and alternative BMPs must be implemented as soon as reasonably possible. Inspection reports shall be maintained

onsite with the Plans during all phases of construction and will be submitted monthly to the Owner.

10.3. APPLICATIONS

10.3.1. Temporary Erosion Control Blankets are rolled erosion control products composed primarily of degradable constituents such as wheat straw, coconut fiber, or aged curled excelsior wood product, and are used for temporary stabilization of soil immediately following seeding until the vegetative cover has grown and is established. Use Class A for slope applications 2:1 or flatter. Use Class B for channel applications where maximum shear stress is less than 1.75 psf.

10.3.2. Sediment Tubes are temporary erosions control devices installed along contours, in drainage conveyance swales, and around drainage inlets to reduce the effects of soil erosion and to retain sediment.

10.3.3. Silt Fence is used as a perimeter control to trap sediment and keep silt, sediment, and construction debris from entering adjacent water bodies, adjoining properties, or areas not to be impacted by construction. Silt fence shall be installed downstream from all grading operations or areas where earth will be exposed due to construction or stockpiling. Additionally, a double row of silt fence shall be installed between areas of exposed soils and adjacent water bodies where a minimum 35 foot undisturbed and natural buffer cannot be maintained.

10.3.4. Stabilized Construction Entrances is a temporary stone stabilized pad with a non-woven geotextile fabric underlining located at defined points of vehicular ingress and egress on construction sites to reduce the amount of mud, dirt, and rocks transported onto public roads by motor vehicles, equipment and runoff. Taper the edges of the entrance out towards to road to prevent tracking of mud at the edge of the entrance, and so that long vehicles do not leave the stabilized area when turning onto or off the paved roadway.

10.3.5. Seeding of all disturbed areas, unless designated by the Plans or the Engineer to be sodded, where construction activities have concluded shall

be initiated as soon as practicable. Also, in areas where construction activities have temporarily ceased, temporary seeding of the disturbed areas shall be performed as soon as practicable unless land disturbing work will be resumed in the area within fourteen (14) days. In either case, stabilization shall be initiated within fourteen (14) days of the work in the area having temporarily or permanently ceased.

10.4. MATERIALS:

10.4.1. Temporary Erosion Control Blankets: Provide ECBs meeting the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 815.2.1.

10.4.2. Steel Posts: Provide steel posts for use with inlet structure filters and silt fences meeting the following minimum physical requirements: Minimum 60 inches long. In areas where conditions warrant, larger posts or reduced post spacing may be required to provide an adequate fence to handle the stress from sediment loading. Composed of high strength steel with minimum yield strength of 50,000 psi. Standard "T" cross-section with a nominal face width of 1.38 inches and nominal "T" length of 1.48 inches. Weighs 1.25 pounds per foot ($\pm 8\%$) painted with water based baked enamel paint.

10.4.3. Sediment Tubes: Provide sediment tubes from the most recent edition of SCDOT Qualified Product List.

10.4.4. Filter Fabric: Provide a filter fabric for inlet structure filter and silt fence from the most recent edition of SCDOT Qualified Product List.

10.4.5. Stabilized Construction Entrance: Provide a stabilized construction entrance composed of a non-woven geotextile fabric meeting the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 804.2.11 and No. 1 aggregate (ASTM C 33) with a gradation meeting the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 815.2.9.

10.4.6. Seed: Ensure that seed conforms to state laws and the requirements and regulations of the South Carolina Department of Agriculture (SCDA). Seeds containing species designated by the State Crop Pest Commission as a plant pest (i.e., noxious weeds) are not permitted. Provide individually packaged or bagged and tagged varieties of seed that show the common and

botanical name of seed with variety, net weight, origin, grower name and lot number, percentages of germination and purity, percentages of other crop seed, inert matter, and weed seed (provide a list of species by botanical name) and other information required by the SCDA. The Owner reserves the right to test and reject or approve any or all seed before application of the seed. For mixtures of different types of seed called for in the seeding schedule, the Contractor may use pre-blended mixtures that are individually packaged or bagged and tagged with the tag specifying the botanical and common name of each species contained in the blend along with the percentages of each species. When pre-blended seed mixtures are not used, each species shall be weighed and mixed in the proper proportions at the site of the work in the presence of the Engineer.

10.4.7. Lime: Use agricultural granular lime at the prescribed rate for all permanent cover applications that is agricultural grade, standard ground limestone conforming to the current Rules, Regulations, and Standards of the Fertilizer Board of Control issued by the Fertilizer Board of Control at Clemson University. Ensure that each bag has affixed in a conspicuous manner a tag or label showing brand or trade name, calcium carbonate equivalent, percent by weight passing prescribed US Standard Sieves, and other pertinent information to identify lime as being agricultural grade, standard ground limestone. Use fast acting liquid or dry forms of lime at the prescribed rate for all temporary cover applications that meet all of the requirements of agricultural grade granular lime specified herein, except percent by weight passing prescribed US Standard Sieves.

10.4.8. Granular Fertilizer: Use granular fertilizer at the prescribed rate for all permanent cover applications that complies with state fertilizer laws. In a mixed fertilizer, such as 10-10-10, the first number represents the percent of nitrogen required, the second number represents the percent of available phosphoric acid required, and the third number represents the percent of water soluble potash required in the fertilizer. Use fertilizer that incorporates a minimum of 50% water insoluble (slow release) nitrogen. Use fertilizer that has a package slip clearly stating the percentages of nitrogen, water insoluble nitrogen, phosphoric acid and potash and the weight in

pounds of nitrogen, phosphoric acid and potash. Animal by-product or municipal waste fertilizers are not acceptable under this Specification.

10.4.9. Biological Growth Stimulants: Provide biological growth stimulants for all permanent cover and temporary cover seeding applications at prescribed rate from a manufacturer listed on the most recent addition of the SCDOT Qualified Product List. Animal by-product, municipal waste, or liquid fertilizers are not acceptable as biological growth stimulants under this Specification.

10.4.10. Seeding Schedule: Contractor shall adhere to the seeding requirements of SCDOT Supplemental Technical Specification SC-M-810-2 (04/11) for temporary and permanent seeding operations or as directed by the Engineer.

10.5. EQUIPMENT: Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the Engineer as to both type and condition before the start of work under this section. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.

10.6. CONSTRUCTION:

10.6.1. General: Prior to any land disturbing activities, the Contractor shall submit an Erosion Control Plan (ECP) to the Engineer for approval. Upon written approval of the ECP, promptly install temporary erosion control measures when problem conditions exist or when potential problems are anticipated in certain areas in order to minimize soil erosion and siltation. Properly maintain the temporary erosion control measures until permanent erosion control features are functioning properly. Coordinate the temporary erosion control provisions with the permanent erosion control features provided elsewhere in these specifications to the extent practical to assure economical, effective, and continuous erosion control during construction. Permanent seeding, sodding, riprap, concrete gutter, asphalt gutter, slope drains, and concrete slope protection are considered permanent erosion control items and are covered in other sections of these specifications

where applicable. Coordinate erosion control measures with the grading operations throughout the duration of the project. Use temporary erosion control measures to correct conditions where problems are anticipated or to correct conditions that develop during construction. Remove temporary erosion control items if no longer needed in an area after establishment of permanent vegetation and completion and proper functioning of other permanent erosion control items as directed by the Engineer. Restore these areas to a condition similar to the surrounding areas after removal.

10.6.2. Temporary Erosion Control Blankets: Construct ECBs in accordance with the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 815.4.2.

10.6.3. Sediment Tubes: Construct sediment tubes in accordance with the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 815.4.5.

10.6.4. Silt Fence: Construct the silt fence in accordance with the Plans or as approved by the Engineer. Place silt fences before the major construction in an area is started. Maintain the silt fence until its capacity has been reached or erosion activity in the area has stabilized. Remove sediment accumulated along the fence when it reaches approximately one-third of the height of the fence, especially if heavy rains are expected. Remove trapped sediment or stabilize on site. Inspect the silt fence every 7 days. Immediately correct any deficiencies. Remove filter fabric and replace whenever it has deteriorated to such extent that it reduces the effectiveness of the silt fence. In addition, review daily the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Install additional silt fences as directed by the Engineer where deficiencies exist. If a silt fence or portion of a fence is located in an area where removing the sediment is not possible, then install a second silt fence, if necessary, at the discretion of the Engineer. In this case, payment for both silt fences and portions involved is made at the unit price for silt fence. Remove silt fence within 30 days after final stabilization is achieved or after temporary Best Management Practices (BMP) are no longer needed.

Permanently stabilize disturbed areas resulting from fence removal. The fence materials remains the property of the Contractor and may be used at other locations provided the materials meet the appropriate requirements contained in this specification and/or on the Plans.

10.6.5. Stabilized Construction Entrance: Construct a stabilized construction entrance at all points where traffic enters or leaves the construction site and moves directly off or onto a public road. Construct the stabilized construction entrance in a manner that adheres to the requirements of SCDOT 2007 Standard Specifications for Highway Construction Section 815.4.14 and is in conformance with the Plans

10.6.6. Seeding:

10.6.7. Perform seeding work during the periods and at the rates specified in the seeding tables of this specification. Do not seed when the ground is frozen and/or when the 10-day forecasted low temperature remains below 35 degrees Fahrenheit. Do not seed when the ground is excessively wet. Do not seed when the ground is excessively dry (periods of drought) unless watering is specified in the Contract or directed by the Engineer.

10.6.8. Prepare the seedbed by ensuring that the areas to be seeded are uniform and conform to the finished grade and cross-section shown on the Plans or as otherwise directed by the Engineer. Perform minor shaping and evening of uneven and rough areas outside of graded sections as directed by the Engineer in order to provide for more effective erosion control and for ease of subsequent mowing and maintenance. Loosen the seedbed (including cut slopes) with suitable and accepted equipment to a minimum of three (3) inches before compost, lime, fertilizer, mulch or seed is applied. Remove stones larger than 2-1/2 inches in any dimension, large clots, roots or other debris brought to the surface.

10.6.9. For permanent grassing applications, agricultural granular lime is not required for this Project. For temporary seeding applications, apply fast acting liquid lime at a rate of 5 gallons per acre (or per the manufacturer's recommendations) or apply fast acting dry lime at a rate of 100 lbs per acre (or per the manufacturer's recommendations). Lime may be applied by approved mechanical spreaders or by hydraulic methods as a mixture of

lime and seed. Uniformly spread lime over the designated areas and thoroughly mix granular lime with the soil to a depth of approximately two (2) inches. Mixing is not required when spreading lime with hydraulic measures.

10.6.10. Apply biological growth stimulants strictly at the manufacturer's recommended rates and ensure that all biological growth stimulant applications strictly follow the manufacturer's recommendations to avoid damage of the seedbed. Apply using an approved hydraulic method. Deliver materials and products sealed in factory labeled packages. Store and handle in strict compliance with the manufacturer's instructions and recommendations. Protect from damage, weather, temperatures, and construction operations. Reapplication may be required due to degradation as a result of soil disturbance or turbidity. The necessity of reapplication will be determined by the Engineer.

10.6.11. Temporary seeding of the disturbed areas shall be performed as soon as practicable and within fourteen (14) days of the work in the area having temporarily ceased unless land disturbing work will be resumed in the area within fourteen (14) days. Using the seed specified in the seeding tables, uniformly sow seed at the rate specified by the use of approved mechanical seed drillers, rotary hand seeders, hydraulic equipment or any other type of equipment that produces a uniform seed application. On small areas inaccessible to equipment, seed may be covered by hand rakes or other methods satisfactory to the Engineer. Temporary cover will be accepted upon sufficient coverage to control erosion for a given area and length of time before the next phase of construction.

10.6.12. Permanent seeding of the disturbed areas shall be performed as soon as practicable and within fourteen (14) days of the work in the area having permanently ceased. Using the seed specified in the seeding tables, uniformly sow seed at the rate specified by the use of approved mechanical seed drillers, rotary hand seeders, hydraulic equipment or any other type of equipment that produces a uniform seed application. On small areas inaccessible to equipment, seed may be covered by hand rakes or other methods satisfactory to the Engineer. Permanent cover will be accepted

upon the establishment of a uniform perennial vegetative cover with a density of 70% of each square yard of the seeded area. A well developed root system must be established to sufficiently survive dry periods and winter weather and be capable of reestablishment in the spring.

10.7. MEASUREMENT AND PAYMENT:

10.7.1. Erosion Control Maintenance is paid on a lump sum (LS) basis; and therefore, there is no specific measurement of quantities for this item. Payment shall be made on a percentage complete basis as approved by the Engineer. Payment for Erosion Control Maintenance is full compensation for the inspection and maintenance of all required temporary erosion control BMPs as described on the Plans and in the approved Erosion Control Plan and includes maintenance, repairs, and removal and disposal of sediment, in accordance with Section 815.4 of the SCDOT 2007 Standard Specifications for Highway Construction. This item is also full compensation for all material, installation, replacement, and/or repair of Stabilized Construction Entrances and any additional temporary erosion control BMPs not shown on the Plans that the Contractor deems necessary to maintain compliance with the NPDES permit throughout the duration of the project.

10.7.2. Temporary Erosion Control Blankets: The quantity of Erosion Control Blanket (of the class specified) is the surface area covered by the erosion control product including seams, overlaps, anchor trenches, and wastage and is measured by the square yard (SY) complete, and accepted by the Engineer. Payment for the accepted quantity is determined using the contract unit bid price includes all direct and indirect costs and expenses necessary to complete the work. Payment is full compensation for furnishing, placing, and maintaining the blankets as specified or directed and includes providing anchor devices and trenches, quality control testing, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

10.7.3. Sediment Tubes: The quantity for the pay item Sediment Tube as indicated in the Contract is each (EA) sediment tube in place, complete, and accepted by the Engineer. Payment for this item is made at the contract unit price bid and is full compensation for furnishing and placing sediment tubes as specified or directed and includes preparing slopes, excavating the footing trench; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

10.7.4. Permanent Cover and Temporary Seeding is measured as the actual ground surface area with acceptable vegetation or stand of cover by the acre (ACRE) complete and accepted. Payment for the accepted quantity of Permanent and Temporary Seeding is made at the contract unit bid price per acre (ACRE) as measured above and includes all direct and indirect costs and expenses necessary to complete the work. Payment for this item is full compensation for furnishing all materials including seed, fast acting lime, biological growth stimulants, labor, equipment, tools, supplies, transportation, and incidentals necessary to complete this work. If the Engineer determines that the Contractor implements all of the requirements of this specification and a satisfactory stand of permanent or temporary cover, meeting the requirements of this specification, is not established, the Contractor will receive payment for the required reapplication. Payment for these items is up to 90% of the Contract unit price until a satisfactory stand of grass meeting the requirements of this specification is established.

10.7.5. Stabilized Construction Entrance quantity for pay is measured in the surface area of the stabilized entrance in-place and is measured by the square yard (SY), complete, and accepted. When replacement stone is authorized by the RCE, the area of replacement stone in the stabilized construction entrance is measured and added to the quantity for this item.

11. PIPE UNDERDRAINS

PERFORATED PIPE UNDERDRAIN WITH GEOTEXTILE (PAY ITEM 27)

END PROTECTORS (PAY ITEM NO. 28)

11.1. MATERIALS

11.1.1. Pipe Underdrain

11.1.1.1. Corrugated Polyethylene Pipe Underdrain

11.1.1.1.1. Provide pipe meeting the requirements of AASHTO M 252 for corrugated polyethylene pipe.

11.1.1.2. Perforated Corrugated Aluminum Alloy Pipe Underdrain

11.1.1.2.1. Provide pipe meeting the requirements of AASHTO M 196 for Type III corrugated aluminum alloy underdrains.

11.1.1.3. Polyvinyl Chloride (PVC) Pipe Underdrain

11.1.1.3.1. Provide PVC pipe meeting the requirements of AASHTO M 278, Class PS 46, cell classification 12454-B as defined in ASTM D 1734, or pipe meeting the requirements of ASTM D 3034, SR 35.

11.1.1.4. Polyethylene (PE) Pipe Underdrain

11.1.1.4.1. In all underdrain applications, polyethylene pipe may be substituted where PVC PS 46 pipe is specified. Ensure that the polyethylene pipe meets AASHTO M 252 with the following exceptions:

- a) Corrugated polyethylene pipe underdrain, in nominal sizes of 4 inches through 10 inches, having a full circular cross-section with an outer corrugated pipe wall and smooth inner liner as specified in AASHTO M 294, Section 4.1.2 – Type S for non-perforated or Section 4.1.4 – Type SP for perforated pipe as specified in the Plans.
- b) Polyethylene pipe underdrain meeting the minimum pipe stiffness (PS) of AASHTO M 278 at 5% deflection when tested in accordance with ASTM D 2412.
- c) Acceptance of polyethylene pipe underdrain is based on conformance with the above specifications. Sampling of the pipe is in accordance with the SCDOT Construction Manual.

11.1.2. Aggregate Fill

11.1.2.1. Use coarse aggregate No. 57 consisting of crushed stone, crushed slag, or gravel conforming to the requirements of SCDOT “Standard Specifications for Highway Construction, Edition of 2007” Subsection 801.2.1 or approved equal.

11.1.3. Material for Endwalls

11.1.3.1. Use Class 2500 or Class 3000 concrete conforming to the requirements of the applicable subsections of SCDOT “Standard Specifications for Highway Construction, Edition of 2007” subsection 701 or approved equal and reinforcing steel conforming to the requirements of the applicable subsections of SCDOT “Standard Specifications for Highway Construction, Edition of 2007” Section 703 or approved equal.

11.2. Equipment

11.2.1. Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the RCE as to both type and condition before the start of work under this section. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.

11.3. Construction

11.3.1. General

11.3.1.1. Excavate trenches for pipe underdrains to a width equal to the outside diameter of the pipe plus 8 inches and to a depth required to permit the pipe to be laid to the desired grade. Where the underdrains are placed in cut sections, place the bottom of the trench at a sufficient depth below the side ditch or median ditch to adequately intercept the water.

11.3.2. Place and tamp a layer of coarse aggregate No. 57 in the bottom of the trench to a depth of 4 inches. Place the pipe in the center of the trench and bed it firmly on the course of aggregate. If bell and spigot type pipe is used, lay the bell end upgrade. Lay perforated pipe with the perforations on the underside of the pipe, except when the pipe is being used strictly for outlet purposes in which case, lay the pipe with the perforations on the upper side

of the pipe. Cover the joints of butt-end drain tile with burlap, roofing paper, or other approved material that is not less than 6 inches in width, is of sufficient length to wrap the entire joint, covers at least 3 inches on each section of pipe turns outward, and lays flat on the bedding course of stone. Lay bell and spigot or tongue and groove pipe without mortar in joints and press the lengths firmly together to prevent infiltration of the aggregate. Join lengths of perforated metal pipe, aluminum alloy pipe, or bituminous-fiber pipe with couplers. Make connections with suitable tee, wye, bend, reducer, or increaser specials as required. Cap or plug the upgrade end in a satisfactory manner if not terminating in a structure.

11.3.3. After the pipe has been laid, inspected, and approved, place coarse aggregate No. 57 around the pipe. Place the aggregate to provide a minimum cover of 4 inches above the top of the pipe, but not less than a minimum depth of 20 inches above the bottom of the pipe. Do not disturb the pipe when placing the aggregate. Fill the remainder of the trench with suitable earth or when directed by the RCE, use aggregate instead of earth backfill. Compact the backfill material in 4-inch layers. Construct in accordance with applicable subsections of SCDOT “Standard Specifications for Highway Construction, Edition of 2007” Section 801.4 or an approved equal.

11.4. Pipe Outlets

11.4.1. Construct pipe outlets and protect with endwalls as directed by the RCE. Use the same type outlet pipe as in the underdrain or, if indicated, use a bell and spigot pipe meeting the requirements specified herein. In all cases, connect the outlet pipe joints and seal in accordance with applicable subsections of SCDOT “Standard Specifications for Highway Construction, Edition of 2007” Section 714 or approved equal or connect and seal with materials recommended by the pipe manufacturer.

11.4.2. Instead of aggregate, fill the trench for pipe outlets with suitable earth material approved by the RCE. Place and compact the earth material in 4-inch layers. Construct endwalls for pipe outlets of Class 2500 or Class 3000 concrete and reinforcing, as specified or directed by the RCE, in accordance with applicable subsections of SCDOT “Standard Specifications for Highway

Construction, Edition of 2007” Sections 701, 702, and 703 or approved equal.

11.5. Measurement

11.5.1. The quantity for the pay item Pipe Underdrain (of the type and size required) is the length of pipe underdrain constructed as specified in-place and is measured by the linear foot (LF) along the centerline of pipe underdrain, complete, and accepted.

11.5.2. When construction of an endwall is required, the quantity of concrete is measured in accordance with SCDOT “Standard Specifications for Highway Construction, Edition of 2007” subsection 701.5 or approved. If required and unless otherwise specified, the quantity of reinforcing steel is measured in accordance with Subsection 703.5. If these items are not included in the Contract, the concrete and reinforcing steel are considered as incidental work for the pipe underdrain and are not measured separately.

11.5.3. If it is necessary to place the bottom of the pipe underdrain more than 36 inches below the subgrade or below the cross-section lines to which the roadway is graded or more than 36 inches below the ground surface when the drain is constructed outside the roadway lines, the quantity of the excavation in excess of 36 inches is measured as Unclassified Excavation in accordance with the provisions of SCDOT “Standard Specifications for Highway Construction, Edition of 2007” subsection 203.5 or approved equal.

11.6. Payment

11.6.1. Payment for the accepted quantity for Pipe Underdrain (of the type and size required), measured in accordance with SCDOT “Standard Specifications for Highway Construction, Edition of 2007” subsection 802.5 or approved equal, is determined using the contract unit bid price for the applicable pay item, and the payment includes all direct and indirect costs and expenses required to complete the work.

11.6.2. Payment for Pipe Underdrain (of the type and size required) is full compensation for constructing pipe underdrains as specified or directed and includes excavating the trench (except that specified beyond 36 inches); furnishing, hauling, and placing the pipe, aggregate, incidental concrete, wyes, tees, bends, joints, bands and coupling, outlets, and other

connections; backfilling and tamping; disposing of surplus materials; and all other materials labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

11.6.3. Unless otherwise indicated, the concrete for construction of endwalls is paid as Concrete Class 2500 or Concrete Class 3000 in accordance with SCDOT "Standard Specifications for Highway Construction, Edition of 2007" subsection 701.6 or approved equal. If the concrete pay item is not included in the Contract, the concrete is considered incidental work for the pipe underdrain, and no separate payment is made for such work.

11.6.4. Unless otherwise indicated, reinforcing steel incorporated in endwalls is paid for using the contract unit bid price for Reinforcing Steel for Structures (Roadway) as specified in SCDOT "Standard Specifications for Highway Construction, Edition of 2007" Subsection 703.6 or approved equal. If this item is not included in the Contract, the reinforcing steel is considered incidental work for the pipe underdrain, and no separate payment is made for such work

11.6.5.

-END OF SECTION-