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Contracts and Procurement Director

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4045 Bridge View Drive, Suite B250
North Charleston, SC 29405-7464



INVITATION FOR BID
No. 4376-10L

SC 61 AT TOBIAS GADSON
(Transportation Sales Tax)

<i>(See Attachment A for details)</i>
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DATE:	December 1, 2009
SOLICITATION NUMBER:	IFB No. 4376-10L
DESCRIPTION OF WORK:	The project is located at the intersection of Ashley River Road (SC 61) and Tobias Gadson Boulevard in Charleston, SC. The project generally consists of the construction of a dedicated right-turn lane from SC 61 to Tobias Gadson Boulevard. This work shall include traffic control, asphalt surfacing, sub-grade preparation, storm drainage improvements, traffic signal modification, pavement marking, roadway signing, the installation of concrete curb and gutter, sidewalks and driveways.
SMALL BUSINESS ENTERPRISE REQUIREMENT	Charleston County Council has amended its Procurement Ordinance to include a mandatory Small Business Enterprise (SBE) subcontract requirement on most procurements and Contracts. See Attachment E, Required Forms, for details on the requirement for this project.
DUE DATE FOR WRITTEN QUESTIONS:	Tuesday, December 15, 2009 AT 5:00 p.m. 843-958-4758 or lwright@charlestoncounty.org
DUE DATE/TIME:	Thursday, January 7, 2010 AT 3:00 p.m.
LOCATION:	Procurement Department 4045 Bridge View Drive, Suite B250 North Charleston, SC 29405

To obtain a copy of this solicitation please visit our website at www.charlestoncounty.org

This solicitation does not commit Charleston County to award a contract, to pay any cost incurred in the preparation of bids submitted, or to procure or contract for the services. The County reserves the right to accept or reject any, all or any part of bids received as a result of this request, or to cancel in part or in its entirety this Invitation for Bids if it is in the best interest of the County to do so. The County will be the sole judge as to whether bids submitted meet all requirements contained in this solicitation.

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INVITATION FOR BIDS (IFB)
GENERAL TERMS AND CONDITIONS

1. PREPARATION, SUBMISSION AND WITHDRAWAL OF BIDS

- A. Bids must be submitted on the forms furnished or copies thereof, and must be manually signed. If erasures or other changes appear on the forms, each erasure or change must be initialed by the person signing the bid. Bids may not be submitted by FAX or other facsimile transmittal.
- B. Mailed or hand-delivered bids must be submitted in a sealed envelope showing the solicitation number on the outside of the envelope and must be addressed to Charleston County Procurement Department, 4045 Bridge View Drive, Suite B250, North Charleston, South Carolina 29405. Each sealed envelope containing a bid shall be marked on the outside with the Bidder's complete name, address, bid number, description of services requested by IFB (i.e., Elevator Maintenance, Road Construction), along with the due date and time. Failure to do so may result in premature opening of, or a failure to open, such bid.

Please note: On the day that responses to County-issued bids, proposals or qualifications are due, and to the extent that someone is present at the Procurement Department's desk situated inside the main lobby at the Lonnie Hamilton III Public Services Building, the County will time-stamp said responses at the Procurement Department's desk.

Responses will be time-stamped in the lobby only on the solicitation's due date between 2:45 p.m. and 3:00 p.m. The County will make every reasonable effort to have someone present to time-stamp responses at the designated date and time. Responses may still be mailed or delivered in person to the Procurement Department in Suite B250 any time prior to a solicitation's due date and time.

- C. **Bids submitted after the "Closing" date and time are considered "Late Bids". "Late Bids" will not be opened or considered.**
- D. Bids may be withdrawn by written request received from the Bidder prior to the time set for closing of bid, but not thereafter.
- E. Bidders shall promptly notify the Charleston County Procurement Department, in writing, and no later than the last date and time for the submittal of written questions, of any ambiguity, inconsistency or error which they may discover upon examination of the IFB documents or the Project premises and local conditions.
- F. Bidders requiring clarification or interpretation of the IFB documents shall make a written request which must be received at the Charleston County Procurement Department no later than the last date and time for submittal of written questions.
- G. Any interpretation, correction or change of the IFB documents will be made by addendum. It is your responsibility to monitor the Procurement website at www.charlestoncounty.org for any additional information, revisions, or addenda that may be posted.
- H. No substitutions will be considered after the Contract award except by amendment or change order.

- I. Failure to submit a bid on the form requested or inclusion of any alternates, unit prices, conditions, limitations or provisions not called for, will render the bid irregular; and shall be considered sufficient cause for rejection of a bid. Failure to complete entries in all blanks on the Bid Form shall be considered cause for rejection of a bid.
- J. The County seeks a single, qualified company to be responsible for completion of the Work (hereinafter "Work") described herein (although the County reserves the option to award portions of the project to multiple bidders if such is to the advantage of the County). Therefore, any one bid submitted by more than one company will be deemed to be a proposal for a joint venture between or among the companies so bidding unless the bid clearly and unequivocally describes that only one firm proposes to act as principal and the other firm(s) contractual position is clearly defined. The companies submitting as a joint venture will be held jointly and severally responsible for the entire project and will not be permitted to limit their liability to the County.
- K. The following are included in the Bid Package:
 - Attachment A: Special Instructions / Terms and Conditions
 - Attachment B: Scope of Work/Specifications
 - Attachment C: Sample Contract
 - Attachment D: Sample Forms
 - Attachment E: Required Forms

2. **NON-COLLUSION OATH**

Every bid must be accompanied by a notarized affidavit of non-collusion, executed by the bidder or in the case of a corporation, by a duly authorized representative of said corporation. The Non-Collusion Oath is provided herein.

3. **BIDDER REPRESENTATIONS**

Each Bidder by submitting a bid represents that:

- A. The Bidder has read and understands this Invitation for Bids (including all specifications and attachments) and that their bid is made in accordance therewith.
- B. The Bidder has reviewed the Invitation for Bids, has become familiar with the local conditions under which the Work is to be performed, and has correlated personal observations with the requirements of the proposed Contract Documents.
- C. The bid is based on the terms, materials, systems and equipment required by this Invitation for Bids, without exception.
- D. The Bidder is qualified to provide the services and equipment required under this IFB and, if awarded the Contract, will do so in a professional, timely manner using Bidder's best skill and attention.

4. **AWARD OF CONTRACT**

- A. Award of Contract will be made to the lowest responsive and responsible bidder(s) whose bid, conforming to the Invitation for Bids, is most advantageous to the County, price and other factors considered.

- B. The County reserves the right to 1) reject any or all bids and any part of a bid; 2) waive informalities, technical defects, and minor irregularities in bids received; and 3) award the bid(s) received on the basis of individual items or groups of items or the entire list of items.
- C. The County shall be the sole judge of the suitability of the items or services to be provided pursuant to this Invitation for Bids.

5. **NOTICE OF AWARD OF CONTRACT**

The successful Bidder will be notified of acceptance of bid by a written Notice of Award of contract. The successful Bidder shall not undertake any work, and the County will not be responsible for payment for any work whatsoever undertaken by successful Bidder prior to issuance of the Notice to Proceed.

The successful Bidder shall be required to submit acceptable Insurance Certificate(s) and Endorsement(s) within five (5) business days after the issuance of the Notice of Award.

6. **CONTRACT DOCUMENT**

The successful Bidder shall be required to execute a formal contract within five (5) calendar days after issuance of a Notice of Award. Said Contract shall be virtually identical in substance and form to the Contract which is attached and marked Attachment C, Sample Contract. The only anticipated changes in Attachment C, Sample Contract, will be to include additional exhibits, to fill in the blanks to identify the successful Bidder, and terms relating to compensation, or to revise the contract to accommodate corrections, changes in the scope of work, or changes pursuant to addenda issued prior to the Bid Closing. **Bidders should raise any questions regarding the terms of the Contract, or submit requested changes in said terms, in the form of written questions or submittals, subject to the deadline for questions.** Because the signed contract will be substantively and substantially derived from Attachment C, Sample Contract, Bidder is urged to seek independent legal counsel as to any questions about the terms, conditions or provisions contained in Attachment C, Sample Contract, before submitting a bid. Again, Attachment C, Sample Contract, contains important legal provisions and is considered part and parcel of this Invitation for Bids. Failure or refusal to sign aforesaid Contract shall be grounds for the County to revoke any Notice of Award which has been issued, forfeit bid security, and award the Contract to another Bidder.

7. **MODIFICATION**

Charleston County has defined this section in the Sample Contract under Section Twenty-Two.

8. **NOTICE TO PROCEED**

A Notice to Proceed will be issued after the successful Bidder has executed the Contract and has submitted acceptable performance and payment bonds (if applicable) to the County as well as other submittals specified herein as required to be delivered before the Notice to Proceed is issued.

The successful Bidder shall not deliver any equipment to the work site or commence work until the successful Bidder has received a written Notice to Proceed from the Contracts and Procurement Director.

9. BIDDER'S QUALIFICATIONS

Before a bid is considered for award, the Bidder may be requested by the County to submit a statement providing additional information regarding their previous experience in performing comparable work.

10. SUBCONTRACTORS

- A. If any subcontractors will be used for this project, the successful Bidder shall provide to the Contracts and Procurement Director a list of names of any of the intended subcontractors, the subcontractor's applicable license number(s), and a description of the work to be done by each subcontractor on the Subcontractor Data Report Form included in the Attachment E, Required Forms.
- B. The successful Bidder shall not substitute other subcontractors without the written consent of the Contracts and Procurement Director.
- C. The successful Bidder shall be responsible for all services performed by a subcontractor as though they had been performed by the successful Bidder. Responsibilities include, but are not limited to, compliance with any applicable licensing regulations.
- D. If at any time the Contracts and Procurement Director determines that any subcontractor is incompetent or undesirable, the director shall notify the successful Bidder accordingly, and the successful Bidder shall take immediate steps for cancellation of the subcontract and replacement.
- E. Nothing contained in any contract resulting from this Invitation for Bids shall create any contractual relationship between any subcontractor and the County.
- F. It shall be the successful Bidder's responsibility to ensure that all terms required in the attached Contract are incorporated into all subcontracts.

11. INDEMNIFICATION

Charleston County has defined this section in the Sample Contract under Section Twenty-Four..

12. TERMINATION

Charleston County has defined this section in the Sample Contract under Section Twenty-Three.

13. DRUG-FREE WORKPLACE ACT

Successful Bidder shall comply with the South Carolina Drug-free Workplace Act, Section 44-107-10 et seq., S.C. Code of Laws (1976, as amended). The County requires all successful Bidders executing contracts for a stated or estimated value of \$50,000 or more to sign a Drug-free Workplace Certification form prior to the issuance of the Notice to Proceed.

14. STATE AND LOCAL TAXES

Except as otherwise provided, Contract prices shall include all applicable state and local taxes.

If applicable, two percent (2%) income tax withholding shall be withheld from each and every payment pursuant to Sections 12-8-540 and 12-8-550 of the South Carolina Code of Laws (1976, as amended) for certain out-of-state contractors, and such sums will be paid over to the South Carolina Department of Revenue (the "SCDOR"). When and if County receives an executed SCDOR Form I-312, Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, such withholding shall cease.

The successful Bidder shall calculate that portion of the Contract which is subject to the seven and one half percent (7.5%) South Carolina sales and/or use tax, which amount shall be itemized and shown on all invoices, and shall be paid to the SCDOR by Contractor. If the successful Bidder is a non-South Carolina company, the County will withhold said amount from all invoices and remit payment to the SCDOR, unless the successful Bidder furnishes County with a valid South Carolina Use Tax Registration Certificate Number.

The successful Bidder shall indemnify and hold harmless the County for any loss, cost, or expense incurred by, levied upon or billed to the County as a result of the successful Bidder's failure to pay any tax of any type due in connection with this Contract.

ATTACHMENT A

SPECIAL INSTRUCTIONS/ TERMS AND CONDITIONS

SPECIAL INSTRUCTIONS/TERMS AND CONDITIONS**1. WRITTEN QUESTIONS DEADLINE:**

The last day and time for submittal of written questions shall be no later than **5:00 p.m., Tuesday, December 15, 2009.**

2. BID SUBMITTAL DEADLINE:

Bids will be received until **3:00 p.m., Thursday, January 7, 2010, (as indicated on the official clock in the Procurement Department)** after which time will be publicly closed and read. Bidders are invited to attend the closing of this bid at the time stated above.

Please note: On the day that responses to County-issued bids, proposals or qualifications are due, and to the extent that someone is present at the Procurement Department's desk situated inside the main lobby at the Lonnie Hamilton III Public Services Building, the County will time-stamp said responses at the Procurement Department's desk. **Responses will be time-stamped in the lobby only on the solicitation's due date between 2:45 p.m. and 3:00 p.m.** The County will make every reasonable effort to have someone present to time-stamp responses at the designated date and time. Responses may still be mailed or delivered in person to the Procurement Department in Suite B250 any time prior to a solicitation's due date and time.

3. PROJECT TIME OF COMPLETION:

Time of completion for this project shall be ninety (90) calendar days from the issuance of a Notice to Proceed.

4. DAMAGES

Charleston County has defined this section in the Sample Contract under Section Twenty.

5. PAYMENT TO CONTRACTOR

Application for Payment shall be prepared and submitted in triplicate pursuant to the specifications contained in this IFB **(See Attachment C, Sample Contract, Section Four).**

6. SECURITY REQUIRED**A. Bid Security**

Each bid must be accompanied by a bid bond acceptable to the County. Bid bonds must be issued by a corporate surety registered and authorized to do business in the State of South Carolina. Bid bonds shall be payable to the County, shall be for at least five (5%) percent of the total amount of the bid, and shall serve as a guarantee deposit that the bid will be carried out to the complete satisfaction of the County. In lieu of a bond, Bidder may submit a certified check or cashiers check in aforesaid amount payable in U.S. funds. Pursuant to County policy, bid security in the form of checks will be deposited with the County Treasurer into the County General Fund. Faxed bid bonds will not be acceptable.

B. Forfeiture of Bid Security

Nonperformance by the successful Bidder, or its failure to execute the Contract and meet performance and payment bond requirements and insurance requirements within five (5) business days after issuance of Notice of Award, shall result in its bid security being forfeited as liquidated damages, and the Notice of Award and Contract will be rescinded and awarded to another Bidder. Withdrawal of a bid after the closing date and time but prior to final award, may also result in forfeiture of bid security.

C. Return of Bid Security

Bid security will be returned to all bidders after the successful Bidder has executed the Contract and delivered all required bonds and insurance certificates. Bidders will not be entitled to any interest earnings on returned funds, and in the case of bid security by check, such will be returned in the form of a County check.

D. Payment and Performance Security

- (1) The successful Bidder shall provide performance and payment bonds, in a form satisfactory to the County (**see Attachment D, Sample Forms,**), in the following amounts no later than at the time of execution of the Contract:

Payment Bond: 100% of the total amount of the Contract.

Performance Bond: 100% of the total amount of the Contract.

- (2) The aforesaid payment and performance bonds must be issued by a corporate surety registered and authorized to do business in South Carolina and must be counter-signed by a licensed, authorized South Carolina agent.
- (3) Attorneys-in-fact who sign bid bonds or performance bonds must file with each bond a certified and effective, dated copy of their power of attorney.
- (4) The time to be covered by the performance bond shall commence on the date of execution of any contract resulting from this IFB and terminate two (2) years after Final Payment to Bidder by County.

The time to be covered by the payment bond shall commence on the date of execution of any contract resulting from this IFB and terminate twelve (12) months after the date of final acceptance of the Work by the County.

- (5) The successful Bidder may submit its payment bond and performance bond by facsimile transmittal preceding the execution of any contract resulting from this IFB; however, the original documents must be received within one (1) business day after receipt of the fax.

7. **PERMITS AND LICENSES**

The successful Bidder shall, without additional expense to the County, be responsible for obtaining and maintaining all necessary licenses and permits required by the State of South Carolina, a municipality or the County or any other authority having jurisdiction. Prior to execution of a contract, the successful Bidder may be required to provide a copy of its current

applicable Contractor's License issued by the State of South Carolina and the County. Any subcontractor must comply with the regulations promulgated in the South Carolina Contractor's Licensing Board as enforced by the South Carolina Licensing Board for Contractors. Contractor's (and or any subcontractor's) License Number, Person's Name and Business Name must all be shown on all required licenses.

8. SMALL BUSINESS ENTERPRISE (SBE) PROGRAM

Charleston County Council has amended its Procurement Ordinance to include a mandatory Small Business Enterprise (SBE) subcontract requirement on most procurements and contracts. See Attachment E, Required Forms, for details on the requirement for this project.

9. DISADVANTAGED BUSINESS ENTERPRISE GOAL

Charleston County Council has established a goal of 20% for Disadvantaged Business Enterprise (DBE) participation on all contracts and procurements.

10. LOCAL VENDOR PREFERENCE OPTION

(1) A Local Vendor Preference Option is available to local vendors. Assuming a local vendor does not provide the lowest price/fee on a particular bid, the local vendor preference option allows the lowest local vendor the opportunity to match the low bid if the local vendor's bid is within 5% or \$10,000 of the non-local lowest responsive bid.

- a. Any vendor claiming the local preference option must meet qualifications stated in Paragraph 2 below.
- b. The Local Vendor Preference Option will be allowed only for bids in which the lowest responsive bid amount exceeds \$10,000.
- c. In the event the procurement is to be made pursuant to state or federal guidelines that prohibit or restrict local preference, then there shall be no local preference used in award.

(2) A local vendor claiming local preference status must meet the following qualifications for the local preference status:

- a. Has a principal place of business located within the limits of the Charleston County. (A post office box or temporary construction or office trailer shall not be considered a place of business).
- b. Has a valid business license issued at least twelve (12) months prior to the particular bid closing in which preference is being asked. The business license may be for any municipality within Charleston County or business license for Charleston County.
- c. Has been engaged in business in Charleston County for at least twelve (12) months.
- d. Has proof of payment of all applicable Charleston County taxes and fees.

(3) Local vendors must state in their bid submittal that they are requesting consideration for Local Vendor Preference.

11. **ADDITIONAL INFORMATION INQUIRIES**

Questions or clarifications concerning this should ***only*** be directed to:

Lanna Wright, CPPB, Senior Buyer
County of Charleston
4045 Bridge View Drive, Suite B250
North Charleston, SC 29405
Tel: 843-958-4755
Fax: 843-958-4758
Email: lwright@charlestoncounty.org

If the Buyer named above is unavailable, please contact:

E. Steven Taylor C.P.M., Contracts and Procurement Director
Tel: 843-958-4750
Fax: 843-958-4758

ATTACHMENT B

SCOPE OF WORK **(WITH APPENDICES)**

SCOPE OF WORK
SPECIFICATIONS - SPECIAL PROVISIONS

I. GENERAL

A. PROJECT DESCRIPTION

The project is located at the intersection of Ashley River Road (SC 61) and Tobias Gadson Boulevard in Charleston, SC. The project generally consists of the construction of a dedicated right-turn lane from SC 61 to Tobias Gadson Boulevard.

This work shall include traffic control, asphalt surfacing, sub-grade preparation, storm drainage improvements, traffic signal modification, pavement marking, roadway signing, the installation of concrete curb and gutter, sidewalks and driveways.

Miscellaneous:

1. This project is scheduled to be completed within ***ninety (90)*** calendar days from the issuance of a Notice to Proceed.
2. All work shall be performed as specified in the South Carolina State Highway Department Standard Specifications for Highway Construction, Edition 2007, *including revisions*.
3. The Project Manager will have the authority to adjust the rate of application as needed at the time of construction.
4. All existing driveways will be resurfaced to the right-of-way if applicable or as directed by Engineer.
5. The Contractor shall perform all Quality Control testing in accordance with SCDOT specifications at no additional cost to the County. Test results shall be given to the County's on-site inspector. Charleston County shall perform all Quality Assurance and Independent Assurance testing in accordance with SCDOT specifications. All required testing shall be performed by an individual certified by the SCDOT for the specific test being performed.
6. Mandatory project meetings between the County and the Contractor will be held weekly for the duration of the contract to discuss the progress of the work and provide schedule updates.
7. Contractor shall submit invoices no later than the 25th day of each month. The Contractor and the County's Project Manager, on or before the 21st day

of each month, shall review and agree on the quantities detailed on an invoice being submitted for payment.

8. The Contractor shall provide temporary stabilization at the end of every work day using straw or equal control erosion when work has stopped for the day. Temporary and permanent grassing will be used at the end of the job or where work has ceased on the job for more than seven (7) days.
9. This project is subject to compliance of the NPDES General Permit for Storm Water Discharges from Large and Small Construction Activities SCR100000 (2006 CGP). This project's auto-coverage number is 65499. The 2006 CGP can be downloaded from the following website: <http://www.scdhec.gov/environment/water/docs/finalcgp.pdf>. The contractor(s) is responsible to ensure compliance, the requirements of the 2006 CGP, the Storm Water Management and Sediment Reduction Act of 1991 and the Federal Clean Water Act (CWA).

The 2006 CGP requires the Contractor to sign a "Co-Permittee Contract and Contractor Certification" statement (shown in Part 3.2D of the CGP). This certification has been incorporated into Attachment E, Required Forms of this document. By signing this certification, the contractor acknowledges that upon award and execution of the contract they will become a Co-Permittee of the NPDES General Permit and will be accountable to ensure the terms and conditions of the NPDES general permit are implemented. In addition, the contractor must certify that the NPDES certification statement and Co-Permittee status will be made part of all subcontractors working on the project.

The County's certified sediment and erosion control inspector and the Contractor's representative shall inspect all stormwater management and erosion and sediment control practices at least once every seven (7) calendar days until the Notice of Termination has been filed with SCDHEC, per the requirements of the 2006 CGP. However, the Contractor shall correct any deficiencies noted within the inspection report.

10. The Contractor shall relocate the "Corbett's Appliance Repairs" sign clear of the new right-of-way on tract number 3 as directed by and to the satisfaction of the Engineer and the property owner. Payment shall be lump sum in accordance with Section 808 of the SCDOT Standard Specifications.

B. APPLICABLE PUBLICATIONS

1. All Work shall be performed and completed in accordance with the Department's 2007 edition including revisions of Standard Specifications for Highway Construction (hereinafter referred to as the "SCDOT Standard Specifications") the AASHTO Standard Specifications for Highway Bridges, 16th Edition, 1996 (including the latest Interim Specifications thereto),

AASHTO's "A Policy on Geometric Design of Highways and Streets - 4th Edition, 2001" (the last two publications hereinafter referred to collectively as "AASHTO"), and any modification which may be recommended and approved by the Department and the Federal Highway Administration.

2. The following publications contain certain provisions made applicable to the Work hereinafter described by specific reference herein and said provisions.

Manual on Uniform Traffic Control Devices, 2003, hereinafter referred to as the "MUTCD".

South Carolina Department of Transportation Standard Drawings for Road Construction Booklet. These drawings depict standard design features commonly used and the standard drawings constitute contract documents in accordance with Section 101 of the Standard Specifications for Highway Construction.

C. APPENDICES AND RELATED DOCUMENTS

All drawings, plans, attachments, and addenda apply to the Work set forth below in the Scope of Work.

The following are attached as Appendices to the Scope of Work and are part of the Scope of Work and the Contract:

Appendix A: Plans
Appendix B: Permits

D. CONSTRUCTION SCHEDULE

The successful Bidder shall, prior to commencement of work, submit to the County or his designated representative a schedule showing the order in which he proposes to carry on the Work indicating the periods during which he will perform work on each item. The County of Charleston reserves the right to determine priority of schedule items, but unless modified by the parties, in writing, the successful Bidder shall have sole responsibility for following and coordinating its schedule. The Contractor shall also be responsible for delivering periodic updates to the schedule, demonstrating actual and planned progress, in such detail as required by the County.

E. COORDINATION AND MEETINGS

Charleston County shall designate a field engineer to serve as project manager (the "Project Manager") for the Work. Such Project Manager shall have the responsibility for and the authority to direct the Work, and, in the event of any disagreement between the Contractor and the Project Manager with respect to the Work, the decision of the Project Manager shall prevail.

The Contractor shall, if requested by the County, prepare a written memorandum on required coordination activities and include such items as required notices and reports. Distribute this memorandum to each entity performing work at the Project Site. Prepare similar memorandum for separate contractors where interfacing of their work may be required.

The Contractor shall, if requested by the County, hold coordination meetings at times convenient for all parties involved should coordination problems arise; request representation at each meeting by every party currently involved in coordination or planning for the work of the entire Project; conduct meetings in a manner which will resolve coordination problems, should those arise; and record results of the meeting and distribute copies to everyone in attendance and to others affected by decision or actions resulting from each meeting.

F. INTERACTION AMONG THE CONTRACTOR, PROJECT MANAGER AND DEPARTMENT

The Project Manager shall coordinate any interaction between the Contractor and the Engineer or Department that may be required by this Scope of Work. To the extent that any document, data, information or other material or items are required by those Scope of Work to be furnished to the Department or the Engineer, they shall instead be furnished to the Project Manager who shall then furnish them, if necessary, to the Department or Engineer. In any case in which the Scope of Work requires that the Contractor seek the approval of the Engineer or the Department, the Contractor shall instead seek such approval from the Project Manager, who shall, if further action should be necessary, refer the matter to the Engineer or the Department.

G. WARRANTY

Excluding any manufacturer's warranties all work and components thereof must be warranted to be free from defects for a "reasonable man's standard" of time as accepted by the trade, provided however, "reasonable man's standard" shall not be construed to be less than twenty-four (24) months after date of final payment by County.

Any and all Manufacturer's warranties on any equipment or materials will be passed on to the County and copies of said warranties will be furnished by the successful Bidder to the County upon completion and final acceptance of the project.

II. SPECIFICATIONS

A. GENERAL

The attached Plans (to this Scope of Work) and/or detail sheets show a width and length of each section of sidewalk or roadway to be constructed or resurfaced. The limits of the work shall be confined to the construction limits shown except by prior contract in writing by both the Contractor and the County.

B. BEGINNING OF WORK

Paragraph 108.6 of the “SCDOT Standard Specifications” is superseded by the following:

The Contractor will be permitted to start work after the signing of the contract and Contractor’s receipt of the Notice to Proceed. However, all work shall be completed within the time frame as indicated in the contract. SHOULD THE CONTRACTOR FAIL TO COMPLETE THE WORK WITHIN THE ALLOWED TIME, THE CONTRACTOR SHALL BE LIABLE TO THE COUNTY IN THE AMOUNT(S) SPECIFIED AS LIQUIDATED DAMAGES IN THIS CONTRACT FOR EACH AND EVERY CALENDAR DAY (INCLUDING SUNDAYS AND HOLIDAYS) THAT THE COMPLETION OF THE PROJECT IS DELAYED BEYOND THE TIME PROVIDED IN THIS CONTRACT, AS FIXED AND AGREED LIQUIDATED DAMAGES AND NOT AS A PENALTY; AND THE COUNTY SHALL HAVE THE RIGHT TO DEDUCT FROM AND RETAIN OUT OF MONIES WHICH MAY BE THEN DUE OR WHICH MAY BECOME DUE AND PAYABLE TO THE CONTRACTOR, THE AMOUNT OF SUCH LIQUIDATED DAMAGES; AND IF THE AMOUNT SO RETAINED BY THE COUNTY IS NOT SUFFICIENT TO PAY IN FULL SUCH LIQUIDATED DAMAGES, THE CONTRACTOR SHALL PAY TO THE COUNTY THE AMOUNT NECESSARY TO EFFECT PAYMENT IN FULL OF SUCH LIQUIDATED DAMAGES.

C. LIMITATION ON USE OF THE SITE:

1. Any waste materials shall be disposed of by the Contractor as approved by County of Charleston at no cost to the County.
2. Hazardous or Toxic Waste: Refer to Special Provision m 1 (“Hazardous and/or Toxic Waste”) hereof.

D. AVAILABILITY OF RIGHT-OF-WAY

All right-of-way areas necessary for the performance of the Work is available for occupancy by the Contractor. Any additional right-of-way required for the Contractor’s operation, plant, equipment, storage of materials, etc. shall be obtained and paid for by the Contractor.

The Contractor's attention is directed to the fact that work under other contracts with the Department and/or the County for grading and drainage construction, roadway pavement construction, bridge construction, erection of guardrail, installation of right-of-way fence and of area lighting systems, sign erection and other work may be in progress along the length of highway simultaneously with the Work to be done hereunder. The Contractor must coordinate his work accordingly and as specified herein or as directed by the Project Manager. He shall permit access by other contractors if and when such access may be necessary for other work in progress.

ANY DAMAGE DUE TO THE CONTRACTOR'S OPERATIONS TO PARTIALLY OR FULLY COMPLETE WORK OF OTHER CONTRACTORS ENGAGED IN THE CONSTRUCTION OF THE HIGHWAY, INCLUDING BUT NOT LIMITED TO, EMBANKMENT CONSTRUCTION, PAVEMENT, SHOULDERS, TOP-SOILING AND SEEDING AND AREA LIGHTING, SHALL BE REPAIRED BY THE CONTRACTOR ENTIRELY AT HIS OWN EXPENSE AND TO THE SATISFACTION OF THE PROJECT MANAGER.

E. EXISTING APPURTENANCES

The Contractor shall be solely responsible for the continuity of service and shall maintain a safe and satisfactory operating condition, all overhead surface, or subsurface utilities affected by his operations.

The Contractor shall exercise every precaution to avoid damage to existing highway installations including (but not limited to) inlets, storm drains, roadway and shoulder pavements, grassed areas, fences and monuments.

The Contractor shall coordinate removal and replacement of all existing utilities i.e., sewer water underground power and communication cables and conduits which are required to be removed, relocated and/or replaced during construction. Before starting construction, the Contractor shall contact all applicable utilities within the limits of construction and shall coordinate with the Project Manager. Each utility shall be located, marked and verified as necessary to prevent damage and/or determine the extent of relocation required. The Contractor shall be solely responsible for coordination of the foregoing within its scheduling.

The identification and location of the utilities shown in the plans are based on limited aboveground surveys only and must not be relied upon as accurate for bidding and construction purposes. It shall be the contractor's responsibility to verify the nature and location of all utilities prior to bidding and construction. It shall also be the contractor's responsibility to anticipate and account for the impact of possible utility conflicts on construction means and methods. Any damage to existing utilities as a result of construction activities and any resulting impact upon the project cost and schedule shall be the responsibility of the Contractor.

Water valves and sewer manholes shall be adjusted by the Contractor (raised or lowered) to match the roadway or sidewalk profile. No additional payment will be made for adjusting water valves or sewer manholes. This work shall include all workmanship and materials necessary to complete this item.

THE CONTRACTOR WILL, AT HIS OWN EXPENSE, MAKE GOOD ANY DIRECT OR INDIRECT DAMAGE THAT SHALL BE DONE IN THE COURSE OF CONSTRUCTION TO ANY UTILITY STRUCTURE, OTHER INSTALLATION OF PROPERTY THROUGH OR BY REASON OF THE PROSECUTION OF THIS WORK. THE LIABILITY OF THE CONTRACTOR UNDER THIS COVENANT IS ABSOLUTE AND IS NOT DEPENDENT UPON ANY QUESTION OF NEGLIGENCE ON HIS PART OR ON THE PART OF HIS AGENT SERVANTS, EMPLOYEES, OR SUBCONTRACTORS, AND THE NEGLIGENCE OF THE COUNTY TO DIRECT THE CONTRACTOR TO TAKE ANY PARTICULAR PRECAUTION OR TO REFRAIN FROM DOING ANY PARTICULAR THING SHALL NOT EXCUSE THE CONTRACTOR IN CASE OF ANY SUCH DAMAGE.

F. LAYOUT OF THE WORK

The Contractor shall be responsible for establishing all lines, elevations, reference marks, etc., required during the progress of the work. The County shall be permitted at all times to check lines, elevations, reference marks, etc., set by the Contractor, who shall correct any errors in lines, elevations, reference marks, etc., disclosed by such checks. Such check shall not be construed to be an approval of the contractor's work and shall not relieve or diminish in any way the responsibility of the Contractor for the accurate and satisfactory construction and completion of the work.

The Contractor shall make, check, and be responsible for all measurements and dimensions necessary for the proper construction of the work.

G. AS BUILT DRAWINGS

The Contractor shall designate one set of Drawings for "As Built Drawings". The Contractor shall indicate all aspects of the work as actually installed. The "As Built Drawings" shall be kept current by the Contractor. The "As Built Drawings" shall be delivered to the County upon completion and acceptance of the work. Final payment for the work will not be made until the "As Built Drawings" have been completed and delivered as indicated above.

H. FIELD QUALITY CONTROL

The Contractor shall furnish all field and laboratory tests for this project as required by "SCDOT Standard Specifications", 2007 edition and SCDOT 2004

Construction Manual. The Project Manager, if available, will be present at the time of testing. No additional payment will be made for quality control services.

I. EARTHWORK, ROADWAY, AND DRAINAGE FACILITIES

1. GENERAL

The Contractor shall furnish all labor, equipment, and materials necessary to complete the earthwork, roadway, and drainage facilities as indicated in the scope of work. All work covered under this section shall conform to the appropriate requirements of the “SCDOT Standard Specifications” Edition 2007 *including revisions* and any additional specifications as may be indicated on the construction drawings or as contained in the following subsections.

2. CLEARING AND GRUBBING

The Contractor shall dispose of all removed vegetation off site.

3. STRIPPING

Stripping shall be defined as the removal of up to a maximum of one foot (1') of soil after clearing and grubbing operations have been completed. The Contractor shall stockpile the stripping for use later as fill outside of paved areas, and or behind curbs and sidewalks.

4. MUCKING

The Contractor shall be required to muck out materials as specified in Section 203.2.1.3 of the “SCDOT Standard Specifications” when directed by the ENGINEER or by the local governmental authority having jurisdiction.

5. BORROW / FILL MATERIAL

The Contractor is advised that use of off-site borrow material shall be approved by the PROJECT MANAGER, prior to use.

6. OVERHAUL

The Contractor is advised that there shall be no additional compensation for hauling of excavated materials unless specifically approved.

7. MEASUREMENT AND PAYMENT

The method of measurement and the basis of payment shall be as called for in the “SCDOT Standard Specifications” except as shown on the unit prices in the Contractor’s bid.

Muck excavation shall be measured as specified in subsection 203 of the “SCDOT Standard Specifications” and the payment shall be by the bid unit price which shall include the removal and satisfactory disposal of unsuitable material.

Borrow/Fill Materials shall be measured as specified in subsection 203 of the “SCDOT Standard Specifications” and payment shall be by the bid unit price which shall be for yardage as measured in place and compacted.

Bases and subbases shall be measured by the square yard for the completed work and payment shall be by the bid unit price.

Bituminous Pavements shall be measured by the ton for the completed work and payment shall be by the bid unit price.

Concrete work for drives and sidewalks shall be measured by the square yard for the completed work and payment shall be by the bid unit price.

J. CLEAN-UP

1. GENERAL

It shall be the Contractor’s responsibility to keep the site neat and clean as construction continues. All rubbish, waste materials, and unnecessary construction equipment shall be removed from the site except as otherwise specified. All construction shall be accomplished so that the public and adjacent property owners will be inconvenienced as little as possible. Contractor shall be responsible for the repair of damage to public and other private lands that resulted from site construction.

2. EROSION AND SEDIMENTATION CONTROL

The Contractor shall provide erosion control measures where necessary to prevent excessive quantities of material and debris beyond that of preconstruction from washing into existing water courses, ditches, gutters, drains, pipes, structures. Such material and debris shall be removed and disposed of during the progress of the construction work and upon completion of the work these conduits shall be in a clean condition. Recommended erosion control procedures including selective and discriminate clearing and grading operations, hay bales, filter fabrics, settling basins, etc.

3. TEMPORARY STRUCTURES AND EQUIPMENT

The Contractor shall remove from the construction site all temporary buildings or structures, equipment, and excess materials utilized during the progress of work.

4. RESTORATION OF PROPERTIES

The Contractor shall restore or replace any damage to public or private properties to a condition at least equal to that of the existing lands prior to site construction work. To this end the CONTRACTOR shall do as required all necessary highway, driveway, walk, or landscape work to restore the properties to their pre-existing conditions.

Payment for seeding shall include all items that will be required to establish a satisfactory stand of grass as outlined in section 810 of the SCDOT Standard Specifications 2007 edition. This includes needed lime, nitrogen, and fertilizer.

K. DEMOLITION ITEM

The Contractor is advised that Regulations of the South Carolina Department of Health and Environmental Control require that anytime a facility is razed a permit must be secured due to health hazards should the building contain asbestos. The Contractor is further advised that it will be his responsibility to inspect the facility for the presence of asbestos and to secure the necessary permits from the South Carolina Department of Health and Environmental Control. If asbestos is located, the terms of Special Provision m 1 ("Hazardous and/or Toxic Waste") shall apply. Any questions about the permit should be directed to the South Carolina Department of Health and Environmental Control's Bureau of Air Quality at (843)734-4547. Please refer to Special Provisions m 1 ("Hazardous and/or Toxic Waste") hereof.

L. HAZARDOUS AND/OR TOXIC WASTE

See special Provision m 1 ("Hazardous and/or Toxic Waste") hereof.

M. SOUTH CAROLINA MINING ACT

See Special Provision m 2 ("The South Carolina Mining Act") hereof.

N. CONTROL AND MAINTENANCE OF TRAFFIC

The Contractor shall designate a responsible member of his organization with sufficient qualifications whose duty shall be the prevention of accidents. This person shall be responsible for assuring that all necessary precautions are taken

for the protection of the public and all workers and for assuring that the Maintenance of Traffic provisions of the “SCDOT Standard Specifications” subsection are effectively administered.

O. TRAFFIC CONTROL AND SAFETY

Contractor shall be responsible for all traffic control and safety in accordance with the “SCDOT Standard Specification”, as well as the “MUTCD 2003”.

A County Representative may issue a stop work directive if unsafe conditions are observed.

P. ASPHALT PLANT

Asphalt must be acquired from a plant with a State Certified lab. A copy of the plant’s certificate shall have been provided to the County before execution of the Contract.

Q. RATE OF APPLICATION

The pounds per square yard specified are set up as an average rate of application. The Project Manager may direct variations wherever conditions warrant.

R. HOT MIXED ASPHALT PAVEMENT

The hot mixed asphalt pavements shall be manufactured and placed in accordance with section 400 of the “SCDOT Standard Specifications”.

S. PRIME OR TACK COAT

Prime or tack coat shall be placed in accordance with section 401.4.18 of the “SCDOT Standard Specifications” consisting of asphalt emulsion grade RS-2 or CRS-2. No additional compensation will be allowed for furnishing and application of the tack coat.

T. CONCRETE PLANT

Concrete must be acquired from a State approved concrete plant. A copy of the plant's certificate shall have been provided to the County before execution of the Contract.

III. SPECIAL PROVISIONS

SPECIAL PROVISION NO. 1 **HAZARDOUS AND/OR TOXIC WASTE**

If the Contractor should encounter or expose during construction operation any abnormal condition which may indicate the presence of a hazardous and/or toxic waste, work in this area shall be immediately discontinued and the Engineer and the Project Manager shall be notified.

Abnormal conditions shall include but shall not be limited to the following: presence of asbestos, presence of barrels, discolored earth, metal, wood, etc., obnoxious or unusual odors, visible fumes, excessively hot earth, smoke or any other indication of hazardous and/or toxic waste. The conditions shall be treated with extraordinary caution.

The Contractor's operations shall not resume until so directed by the Engineer and the Project Manager.

If a building is razed, the Contractor is advised that it will be his responsibility to secure the necessary permits in accordance with the South Carolina Department of Health and Environmental Control requirements.

Disposition of the hazardous and/or toxic waste shall be made in accordance with the requirements and the regulations of the South Carolina Department of Health and Environmental Control.

Where the Contractor performs necessary work required to dispose of these materials, payment will be made at the Contract unit price for items applicable to such work or payment shall be made in accordance with Subsection 104.04 or 109.04 of the "SCDOT Standard Specifications". Should the disposition of waste material require special procedures by certified personnel, the County will made arrangements with qualified persons to dispose of the material.

SPECIAL PROVISION NO. 2 **THE SOUTH CAROLINA MINING ACT**

The South Carolina Mining Act enacted by the General Assembly in 1978 requires that the Department adopt reclamation standards to govern activities of the Department and any person acting under contract with the Department, on highway rights-of-way or material pits maintained solely in connection with the construction, repair, and maintenance of the public road systems of South Carolina.

STANDARD PLAN FOR THE RECLAMATION OF EXCAVATED AREAS ADAPTED BY SOUTH CAROLINA STATE HIGHWAY DEPARTMENT

Reclamation plans as stated herein shall include all areas disturbed in excavations of borrow and materials pits, except planned inundated areas.

The final side slopes of areas excavated for borrow and material pits shall be left at such an angle so as to minimize erosion and the possibility of slides. The minimum slope in every case shall be not less than 3:1.

Excavated areas will be drained where feasible unless otherwise requested by the property owner where, in such instances, the property owner may wish to develop the excavated area for recreational purposes or for the raising of fish, or for other uses, in compliance with Section 8 of the South Carolina Mining Act.

Where material is stripped from the ground surface in relatively thin layers, the area, after excavation has been completed, will be thoroughly scarified and terraced and planted to establish satisfactory vegetation necessary to control erosion.

Excavated areas that are drained will be seeded to obtain a satisfactory vegetative cover. The side slopes of excavated areas will be planted to vegetation.

The drainage from excavated areas and the runoff from ground surface areas will be diverted over vegetated or forested areas before discharging into live streams, where practicable, so as to minimize the depositing of sediment in live streams.

The State Highway Engineer, or his duly appointed representative will make a final inspection of the reclaimed area and keep a permanent record of his approval thereof. A map or sketch providing the location and approximate acreage of each pit used on the Project will be made available to the Final Plans Engineer for submission to the Land Resources Commission.

All applicable regulations of agencies and statutes relating to the prevention and abatement of pollution shall be complied with by the contractor in the performance of the contract. The Contractor shall comply with the provisions of the plans which are applicable to the Project as determined by the Project Manager. Seeding or other work necessary to comply with the plan on pits furnished by the contractor shall be at the expense of the contractor. Bermuda shall not be planted on ground surface pit areas. The quantity of fescue seed specified in Schedules 1 and 2 as shown in subsection 810.04 of the "SCDOT Standard Specifications" shall be increased by fifteen (15) pounds in lieu of the deleted Bermuda seed.

SPECIAL PROVISION NO. 3 **TRAFFIC CONTROL – SC61 @ SC61 TOBIAS GADSON**

TRAFFIC CONTROL:

The Contractor shall execute the item of Traffic Control as required by the Standard Specifications, the plans, the Standard Drawings For Road Construction, these special provisions, all supplemental specifications, the MUTCD, and the Engineer. This is an amendment to the Standard Specifications to require the following:

GENERAL REGULATIONS -

These special provisions shall have priority to the plans and comply with the requirements of the MUTCD and the standard specifications. Revisions to the traffic control plan through modifications of the special provisions and the plans shall require approval by the department. **Final approval of any revisions to the traffic control plan shall be pending upon review by the Director of Traffic Engineering.**

Install and utilize changeable message signs in all lane closures installed on high volume high-speed multilane roadways. Use of changeable message signs in lane closures installed on low volume low speed multilane roadways is optional unless otherwise directed by the plans and the Engineer. Install and use a changeable message sign within a lane closure set-up as directed by the *Standard Drawings For Road Construction*. When a lane closure is not present for any time to exceed 24 hours, remove the changeable message sign from the roadway. Place the sign in a predetermined area on the project site, as approved by the Engineer, where the sign is not visible to passing motorists. Utilize preprogrammed messages in accordance with the *Standard Drawings For Road Construction* when using the changeable message sign as part of the traffic control set-up for lane closures. Only those messages pertinent to the requirements of the traffic control situation and the traffic conditions are permitted for display on a changeable message sign at all times. At no time will the messages displayed on a changeable message sign duplicate the legends on the permanent construction signs.

During operation of changeable message signs, place the changeable message sign on the shoulder of the roadway no closer than 6 feet between the sign and the near edge of the adjacent travel lane. When the sign location is within 30' of the near edge of a travel lane open to traffic, supplement the sign location with no less than 5 portable plastic drums placed between the sign and the adjacent travel lane for delineation of the sign location. Install and maintain the drums no closer than 3 feet from the near edge of the adjacent travel lane. This requirement for delineation of the sign location shall apply during all times the sign location is within 30' of the near edge of a travel lane open to traffic, including times of operation and non-operation. Oversized cones are prohibited as a substitute for the portable plastic drums during this application.

All signs mounted on portable sign supports shall have a minimum mounting height of 5' from the ground to the bottom of the sign. All signs mounted on ground mounted U-channel posts shall have a minimum mounting height of 7' from the ground to the bottom of the sign.

When covering signs with opaque materials, the Department prohibits attaching a covering material to the face of the sign with tape or a similar product or any method that will leave a residue on the retroreflective sheeting. Residue from tape or similar products, as well as many methods utilized to remove such residue, damages the effective reflectivity of the sign. Therefore, contact of tape or a similar product with the retroreflective sheeting will require replacement of the sign. Cost for replacement of a sign damaged by improper covering methods will be considered incidental to providing and maintaining the sign; no additional payment will be made.

Signs not illustrated on the typical traffic control standard drawings designated for permanent construction signs shall be considered temporary and shall be included in the lump sum price bid item for "Traffic Control" unless otherwise specified.

Install and maintain any necessary detour signing as specified by the typical traffic control standard drawings designated for detour signing, Part VI of the MUTCD, these Special Provisions, and the Engineer. The lump sum price bid item for "Traffic Control" includes payment for installation and maintenance of the detour signing.

The Contractor shall maintain the travel patterns as directed by the traffic control plans and shall execute construction schedules expeditiously. The Contractor shall provide the Resident Engineer with no less than a two-week prior notification of changes in traffic patterns.

During nighttime flagging operations, flaggers shall wear a safety vest and safety pants that comply with the requirements of ANSI / ISEA 107-2004 standard performance for Class 3 risk exposure or latest revisions and a fluorescent hard hat. The safety vest and the safety pants shall be retroreflectorized and the color of the background material of the safety vest and safety pants shall be fluorescent orange-red.

During nighttime flagging operations, the contractor shall illuminate each flagger station with any combination of portable lights, standard electric lights, existing street lights, etc., that will provide a minimum illumination level of 108 Lx or 10 fc.

During nighttime flagging operations, supplement the array of advance warning signs with a changeable message sign for each approach. These changeable message signs are not required during daytime flagging operations. Install the changeable message signs 500' in advance of the advance warning sign arrays. Messages should be "Flagger Ahead" and "Prepare To Stop".

During the paving operations, the length of roadway with an acceptable grade elevation difference less than or equal to 2" shall be restricted to 4 miles.

During the surface planing operations, the length of roadway with an acceptable grade elevation difference less than or equal to 1" shall be restricted to 4 miles.

LANE CLOSURE RESTRICTIONS -

The Department prohibits lane closures on S.C. Route 61 Monday through Friday from 5:00 am to 7:00 pm. These restrictions also apply to all road closures and paving operations. The Department reserves the right to suspend a lane closure if any resulting traffic backups are deemed excessive by the Engineer. Maintain all lane closure restrictions as directed by the plans, these special provisions, and the Engineer.

The Department reserves the right to restrict the installation of lane closures on interstates and high volume primary routes when the presence of a lane closure will seriously hinder normal traffic flow during extended holiday periods. An extended holiday period is hereby defined as those days preceding and following the holiday that experience significant increases in the volume of traffic due to the holiday as determined by the

Department. Also, the Department reserves the right to increase an extended holiday period if excessive traffic disruptions occur during those days prior to and after the established extended holiday period. Extended holiday periods include but are not limited to the week of Thanksgiving, the weeks before and after Christmas, and the weeks before and after the 4th of July. The Contractor should submit inquiries to the Engineer regarding specific days of an extended holiday period no less than two weeks prior to entering into an extended holiday period. The Contractor should make these inquiries annually due to the progressive nature of the calendar.

A reduced regulatory speed limit of 35 MPH shall be in effect during the construction of this project. Erect temporary regulatory “Speed Limit” signs (R2-1-48-35) and “Speed Reduction 35 MPH” signs (W3-5-48-35) on temporary supports according to the typical traffic control standard drawings. Cover the existing regulatory speed limit signs when reduced speed limits are in place.

The static “Prepare To Stop” sign placed on a truck has been replaced with a truck mounted changeable message sign displaying the message, “Prepare To Stop”. The Department prohibits the Contractor from conducting work and maintaining a lane closure in place that generates a traffic queue without the presence of a truck mounted changeable message sign in place on the shoulder to provide advance notice to motorists to be prepared to stop. The Department requires the Contractor to immediately stop work and remove the lane closure if the Contractor fails to or is unable to provide the required truck mounted changeable message sign when a traffic queue develops.

The truck mounted changeable message signs are in addition to the requirements for trailer mounted changeable message signs. Truck mounted changeable message signs and trailer mounted changeable message signs are not interchangeable.

SHOULDER CLOSURE RESTRICTIONS -

On primary and secondary roadways, the Department prohibits the Contractor from conducting work within 1’ or less of the near edge of an adjacent travel lane under a shoulder closure. All work that may require the presence of personnel, tools, equipment, materials, vehicles, etc., within 1’ of the near edge of an adjacent travel lane shall be conducted under a lane closure.

The Contractor shall install all shoulder closures as directed by the typical traffic control standard drawings designated for shoulder closures, and the Engineer. Substitution of the portable plastic drums with oversized cones during nighttime shoulder closures is PROHIBITED.

When working in an outside shoulder area within 30’ of the adjacent travel lane, the Contractor shall close the adjacent shoulder as directed by the typical traffic control standard drawings designated for shoulder closures. “Case 1” shall apply whenever the Contractor must conduct work or occupy the shoulder area beyond the restrictive area, 1’ or 10’ of the near edge of the adjacent travel lane as specified above, but within 15’ of the near edge of the adjacent travel lane. “Case 2” shall apply whenever the Contractor is conducting work beyond 15’ but within 30’ of the near edge of the adjacent travel lane. Any work that requires the Contractor to encroach within the restrictive area, 1’ or 10’ of

the near edge of the adjacent travel lane as specified above, shall require the Contractor to install a lane closure instead of a shoulder closure.

TYPICAL TRAFFIC CONTROL STANDARD DRAWINGS -

The typical traffic control standard drawings of the “Standard Drawings For Road Construction”, although compliant with the MUTCD, shall take precedence over the MUTCD. The typical traffic control standard drawings of the “Standard Drawings For Road Construction” shall apply to all projects let to contract.

Install the permanent construction signs as shown on the typical traffic control standard drawings designated for permanent construction signing.

Scheme C	Tobias Gadson	76 Square Feet
Scheme D	S.C. Route 61	152 Square Feet
Scheme E	William Kennerty Drive	24 Square Feet
Total		252 Square Feet

STAGING

(S.C. Route 61 @ Tobias Gadson Blvd.)

STAGE 1

Construction of the right-turn lane along S.C. Route 61 onto Tobias Gadson Blvd. and all widening along Tobias Gadson Blvd. associated with the addition of the pavement along S.C. Route 61 shall occur in this stage.

Install all permanent construction signs prior to entering into Stage 1. A reduced regulatory speed limit of 35 mph shall be in effect on S.C. Route 61 during the whole period of construction. Erect temporary regulatory “Speed Limit” signs and “Reduced Speed Ahead” signs on temporary supports according to the typical traffic control standard drawing, the MUTCD, and the Engineer. Maintain all existing regulatory signs (Stop signs, Yield signs) during the whole period of construction unless otherwise specified in the traffic control plans.

Conduct clearing and grubbing operations throughout the project site as necessary during this stage.

Install portable plastic drums adjacent to the left or right edges of the existing S.C. Route 61 and Tobias Gadson Blvd. at 20 ft. intervals as illustrated in the plans, as directed by the typical traffic control standard drawings, the Standard Specifications for Highway Construction and the Engineer. Install these portable plastic drums immediately upon disturbing the existing shoulder.

Use flagging operations along S.C. Route 61 should construction encroach on the existing travel lanes. Conduct flagging operations in accordance with the typical traffic control standard drawings, the MUTCD, and the Engineer.

Apply the permanent pavement markings during Stage 1.

Install and maintain the traffic control for the application of the permanent pavement markings as directed by the typical traffic control standard drawings designated for mobile operations, the Standard Specifications for Highway Construction, these special provisions, and the Engineer.

THERMOPLASTIC PAVEMENT MARKINGS CANNOT BE PLACED ON ASPHALT UNTIL THE FINAL SURFACE HAS BEEN IN PLACE AT LEAST 20 DAYS.

SPECIAL PROVISION NO. 4 **CRANE SAFETY**

CRANE SAFETY:

The contractor's attention is directed to the following Crane Safety criteria. All items listed shall be submitted to the Resident Construction Engineer (RCE) before any crane operations can proceed. If any personnel or equipment is changed or added, all applicable items shall be updated and submitted to the RCE before continuing with crane(s) operations.

All contractors shall comply with the manufacturer specifications and limitations applicable to the operation of any and all cranes and derricks. Prime contractors and sub-contractors shall comply with the latest Occupational Safety and Health Administration regulations (OSHA), the American National Standards Institute [ANSI] adopted American Society of Mechanical Engineers (ASME) crane standards, and other applicable standards including, but not limited to the following:

- OSHA 29 CFR 1926.550 "Cranes, Derricks, Elevators, & Conveyors"
- OSHA 29 CFR 1926.605 "Marine Operations & Equipment"
- OSHA 29 CFR 1926.251 "Rigging Equipment for Material Handling"
- OSHA 29 CFR 1926.32 "Definitions"
- ASME B30.5-2000 "Mobile and Locomotive Cranes"
- ASME B30.8-1999 "Floating Cranes and Floating Derricks"

Crane Safety Submittal List

1. Site Specific Safety Plan: Guidelines for crane and lifting operations shall be developed by a qualified person, for each contractor conducting crane and lifting operations on the project. Subcontractors must submit their Work Plan to the prime contractor for approval before submittal to the SCDOT. Plans shall address site conditions such as environmental conditions, wind, adjacent structures, overhead power lines, underground utilities, crane/barge combination procedures, public protection and identification of routes for suspended loads to ensure no employees are working directly below the load. Plans shall provide for conducting pre-lift meetings prior to lifting operations as necessary.

2. Critical Lifts: Contractor shall submit Critical Lift Procedures, including a critical lift checklist and critical lift identification process. All critical lifts shall be identified and properly safeguarded. A critical lift is defined as a load equaling 75% of the rated capacity of the crane after all deductions, whether on land, on a barge, or if a load requires the use of more than one crane. Critical lift checklists, which include the date/time completed, shall be available for review upon request.

3. Crane Inspections: Inspection records for all cranes shall be current and readily accessible for review upon request. Contractor shall submit proof of crane inspector qualifications and training.

- a. A copy of the most recent periodic [annual] crane inspection conducted by a competent person, and the documented correction of defects shall be submitted.
- b. A copy of the frequent [monthly] crane inspection conducted by the competent person(s) and documented correction of defects shall be submitted.

4. Safety Person: Provide the name and qualifications of the “Competent Person” responsible for crane safety and lifting operations. The named competent person will have the responsibility and authority to stop any work activity due to safety concerns.

5. Crane/Barge Combinations: Contractor shall provide a plan prepared by a competent person for all lifts on floating crane/barge combinations. The plan shall include lifting capacities and method of securing the crane to the barge. Critical lifts on floating crane/barge combinations shall be certified by a qualified professional engineer before the lift.

6. Riggers: Provide the qualifications, experience and training of the persons responsible for rigging operations. Training should include, but not be limited to, weight calculations, center of gravity determinations, sling selection and capacities, sling and rigging equipment inspection, safe rigging practices, and determining load weights.

7. Crane Operators:

- For critical lifts, all crane operators shall be certified by the National Commission for the Certification of Crane Operators (CCO) or the National Center for Construction Education and Research (NCCER).
- For non-critical lifts, crane operators shall be CCO or NCCER certified. In lieu of CCO or NCCER certification, the following are acceptable until January 2009:
 - o Crane operators must have satisfactorily completed the Carolinas AGC’s Professional Crane Operator’s Proficiency Program, as approved by the SCDOT; or
 - o Crane operators shall have a minimum of 5 years of experience, and be under the direct supervision of someone who is either CCO or NCCER certified, has satisfactorily completed the Carolinas AGC’s Professional Crane Operator’s

Proficiency Program, or has satisfactorily completed the Carolinas AGC's Lift Supervisor program, as approved by the SCDOT.

- For crane lifts less than 50% of the rated capacity, after all deductions, which are not within a boom length of traffic, railroads, or public access areas, crane operators shall either be CCO or NCCER certified, or under the direct supervision of someone who is CCO or NCCER certified. In lieu of CCO or NCCER certification, the following are acceptable:
 - Crane operators must have satisfactorily completed the Carolinas AGC's Professional Crane Operator's Proficiency Program, or
 - Crane operators shall be under the direct supervision of someone who has satisfactorily completed the Carolinas AGC's Professional Crane Operator's Proficiency Program, or Carolinas AGC's Lift Supervisor's Program.

Contractor shall submit current CCO or NCCER certification, or documentation of completion of the Carolinas AGC's program*, along with medical evaluations**, and resume of relevant work experience for each operator and supervisor.

* Operator proficiency program training must remain current, within a 5-year expiration date.

** Medical evaluations must remain current, within a 3-year expiration date. Medical evaluation shall meet or exceed the CCO or NCCER medical evaluation requirements [utilize either the CCO or NCCER Physical Examination Form or a current DOT Medical Examiner's Certificate].

SPECIAL PROVISION NO. 5 **LATE DISCOVERY OF ARCHEOLOGICAL/HISTORICAL REMAINS AND** **APPROVAL OF DESIGNATED BORROW PITS**

A. Late Discovery of Archaeological/Historical Remains.

1. Responsibilities:

The Contractor and subcontractors must notify their workers to watch for the presence of any prehistoric or historic remains, including but not limited to arrowheads, pottery, ceramics, flakes, bones, graves, gravestones, or brick concentrations. If any such cultural remains are encountered, the Resident Construction Engineer shall be immediately notified and all work in the vicinity of the discovered materials or site shall cease until the Department's Staff Archaeologist or the State Highway Engineer directs otherwise.

2. Applicability:

This provision covers all areas of ground disturbance resulting from this federal - aid contract, including but not limited to road construction, Department designated borrow pits, Contractor furnished borrow pits, and/or staging areas.

3. Cost Reimbursement and Time Delays:

Any extra work required by A(1) above within the project right of way or on Department designated borrow pits (see below) will be paid for in accordance with Subsection 104.05 of the Standard Specifications. Extra contract time may be provided under Subsection 108.06 of the Standard Specifications for archaeological work within the project right of way or on designated borrow pits.

NOTE: On Contractor furnished borrow pits the contractor is not entitled to any additional time or money for delay on impact resulting from A(1) above or for extra work required by A(1) above. Therefore, contractors may wish to retain professional archaeological services to better ensure that borrow pit areas are cleared of archaeological/historical remains prior to use on Federal aid projects.

B. Approval of Designated Borrow Pits on Federal Aid Projects (Plant Sites which qualify as commercial are not included).

In instances where the Department specifically designates the location of borrow pits on project plans or in contract specifications for use on a Federal aid project, an archaeological survey will be performed by Department archaeologists prior to award of contract.

This provision also applies to designated disposal sites, staging areas, haul roads, and job site field offices.

SPECIAL PROVISION NO. 6 **DETECTABLE WARNING SURFACE**

Description:

Detectable warnings are an Americans with Disabilities Act (ADA) requirement for the purpose of detecting the boundary between the sidewalk and the street. The detectable warning surface is a feature built in or applied to walking surfaces to warn visually impaired people where to stop. Generally, they are used where the sidewalk crosses or adjoins a vehicular way and the two surfaces are not separated by a curb, rail or other element excluding un-signalized driveway crossings. Truncated domes are the only detectable warning surface allowed along with a visually contrasting surface.

Materials:

The detectable warning surface consists of raised truncated domes with a base diameter of nominal 0.9 –1.4 inch, a height of nominal 0.2 inch and a center-to-center spacing of nominal 1.6 –2.4 inches. The pattern for the domes is a square pattern arranged in a parallel alignment. Minimum space between the domes at their base is 0.65 inch measured along any line of domes

uniform over the entire detectable warning surface. See Standard Drawing 720-7 for details. Detectable warning surfaces must be listed on the Department's Approval Sheet prior to installation.

Detectable warning surfaces visually contrast with the adjoining surfaces. The SCDOT has selected the color "safety yellow" (Federal Number 33538) to meet this requirement. If a specific project requires another color other than safety yellow, the color selected will contrast either light-on-dark or dark-on-light.

Construction:

Cast detectable warnings into the newly poured concrete ramps or apply surface mounted detectable warnings after the walkway has cured. If existing ramps are retrofitted, use only the surface mount type of detectable warning. See Standard Drawing 720-7 for details.

Follow the manufacture's instructions for the proper installation of detectable warning surfaces. Provide copies of the manufacturer's literature to the Engineer to verify material and construction procedure compliance.

Method of Measurement:

The Engineer will measure detectable warnings by the square foot.

Basis of Payment:

Payment includes all costs for labor, materials, and incidentals to construct the detectable warnings in accordance with this Special Provision, Standard Drawing 720-7, and the manufacture's requirements. The bid item, description, and unit are as follows:

Item number	Description	Unit
7204900	DETECTABLE WARNING SURFACE	SF

SPECIAL PROVISION NO. 7
CONSTRUCTION STAKES LINES AND GRADES

Section 105.8.2 applies to this project. Payment for this work shall be made according to the following schedule:

Percent Contract Complete	Percent of Stakes, Lines, and Grades bid amount to be paid
1 – 5	20
6 – 15	40
16 – 29	60
30 – 49	70
50 – 69	80
70 – 89	90
90 - 100	100

SPECIAL PROVISION NO. 8
PROMPT PAYMENT CLAUSE

- (1) Subject to the provisions on retainage provided in Paragraph (2) below, when a subcontractor has satisfactorily performed a work item of the subcontract, the Contractor must pay the subcontractor for the work item within seven (7) calendar days of the Contractor's receipt of payment from SCDOT. A subcontractor shall be considered to have "satisfactorily performed a work item of the subcontract" when the SCDOT pays the Contractor for that work item.
- (2) The Contractor may withhold as retainage up to five (5%) percent of a subcontractor's payment until satisfactory completion of all work items of the subcontract. "Satisfactorily completion of all work items of the subcontract" shall mean when the SCDOT pays the Contractor for the last work item of the subcontract. The Contractor must release to the subcontractor any retainage withheld within seven (7) calendar days from the date the Contractor receives payment from SCDOT for the last work item of the subcontract.
- (3) Prior to receiving payment of each monthly estimate, the Contractor shall certify to SCDOT that the construction estimate is complete and that all subcontractors have been paid for work covered by previous estimates.
- (4) Failure to comply with any of the above provisions shall result in one or more of the following sanctions: (1) no further payments to the Contractor unless and until compliance is achieved; (2) the Contractor being placed in default; and/or (3) the Contractor being declared delinquent, such delinquency being subject to procedures and penalties provided in 108.08 of the Standard Specifications.

SPECIAL PROVISION NO. 9
AS-BUILT CONSTRUCTION PLANS

GENERAL

The Contractor shall produce and deliver to the Department the final As-Built plans for this contract. This set of As-Built plans is not intended to document final quantities, but is intended to show approved revisions to the contract design including but not limited to: revised roadway profiles and cross sections, revised typical sections, revised drainage installations, any changes to the demolition and removal items and any other changes to the original design.

If any design changes occur during construction, the plan sheets (or any other "job site record document" with a seal) revised after award of contract shall include a complete accounting and detail of the revisions and design changes. The P.E. responsible for the revisions shall seal each altered plan sheet (or any other "job site record document" with a seal). This documented information is to be part of the As-Built Plan requirements.

The As-Built plans shall be neat, legible and of the correct size. Bridge projects and any road projects which include Plan, Profile and Cross-Section Sheets shall be full size. In general, if the job was let with full size plans (22" X 36"), the As-Built shall be full size. All revisions to the original plans shall be delineated in red ink, located properly on the drawing, they shall be legible and true to scale. Every As-Built Plan, Profile and Cross-section Sheet shall be designated as such by note or stamp "As-Built" in red. The As-Built Plans shall be bound in the same manner as they were let, not combined. In other words, if a project includes road and bridge work and each is bound separately, keep them separate for As-Built, each with its own AB201 cover sheet.

In submitting As-Built Plans, the Contractor shall be required to complete FORM AB205 or AB206 whichever is applicable, and submit the form with the required deliverables to the RCE. The items and notes on these forms that apply to this project establish the minimum requirements for As-Built Plans. The forms can be found on the SCDOT website at <http://www.scdot.org/doing/default.html>.

The final As-Built plans shall be submitted within forty-five (45) days following the substantial work complete date of the project.

MEASUREMENT

Measurement is to be on a lump sum basis.

PAYMENT

Payment for this item is to be as follows:

50% of the contract amount is to be distributed over the duration of the project, and paid in amount proportional to the amount of contract work completed.

The remaining 50% of the contract amount is to be paid on the final estimate if As-Built plans meet the requirements to the satisfaction of the Resident Engineer.

In no case is payment to be in excess of the original bid amount for this item.

The Bid Item for this work is as follows:

<u>Item Number</u>	<u>Item</u>	<u>Unit</u>
1090200	As-Built Construction Plans	LS

SPECIAL PROVISION NO. 10 **ADHESIVELY BONDED ANCHORS AND DOWELS**

The following Standard Drawings have been identified as showing Adhesively Bonded Anchors or Dowels:

605-205-03	Temporary Concrete Barrier
605-210-04	Temporary Concrete Barrier
605-310-01	Temporary Concrete Barrier
605-315-00	Temporary Concrete Barrier
605-320-00	Temporary Concrete Barrier
605-325-00	Temporary Concrete Barrier
605-330-00	Temporary Concrete Barrier
651-105-00	Barrier Mounted Sign Post
657-100-00	Overhead Sign Support Roadway Bridges
722-105-01	Box Culvert (Used to connect headwall, wingwalls, and for extensions)
805-120-00	Guardrail (W Beam) Base Plate Connection
805-405-03	Guardrail (Tubular Beam) Bridge Railing
805-405-04	Guardrail (Tubular Beam) Bridge Railing
806-505-00	Fence (Ornamental Steel Picket)

It is the contractor's responsibility to determine if Adhesively Bonded Anchors or Dowels are a part of the project, and to comply with the provisions of the Supplemental Specification.

1.0 Adhesively Bonded Anchors and Dowels

1.1 Scope

Furnish all required labor, equipment, and materials and perform all operations necessary for installing anchors and dowels in concrete using an adhesive bonding system in accordance with the details shown on the Plans and with the requirements of this Specification. Provide a material system specifically intended for use in structural applications for bonding anchors and dowels to hardened concrete. Limit applications to anchors and dowels installed in horizontal, vertical, and downwardly inclined positions. Do not use adhesive anchors in overhead or upwardly inclined installations. See Figure 1.1.

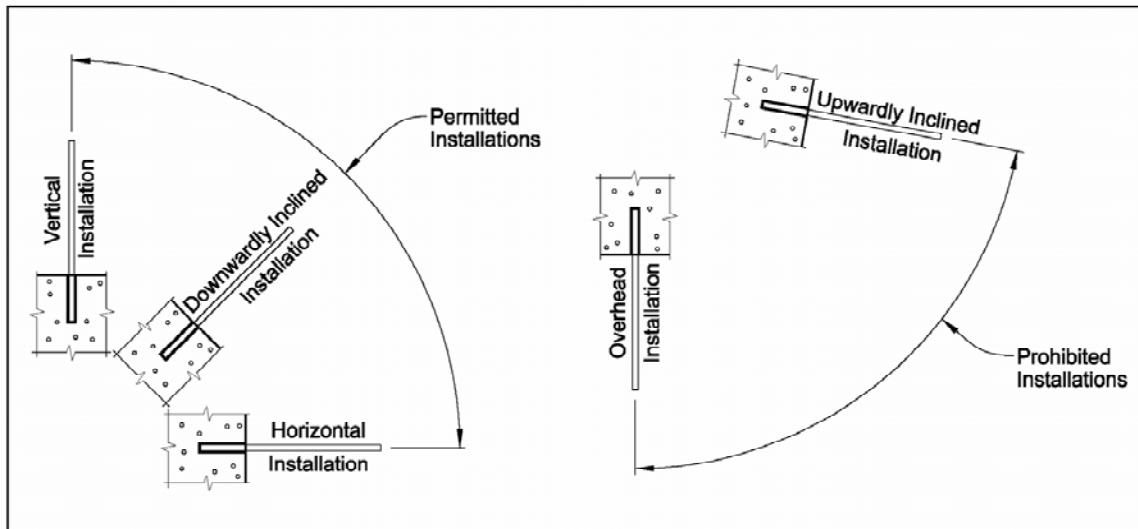


Figure 1.1

Submit a description of the proposed adhesive bonding system to the RCE for review, comments, and acceptance. Include in the description the anchor type, equipment, Manufacturer's recommended hole diameter, material specifications, and any other material, equipment or procedure not covered by the contract documents. List the properties of the adhesive, including density, minimum and maximum temperature application, setting time, shelf life, pot life, shear strength, bond strength, and compressive strength. If anchors or dowels containing a corrosion protective coating are required, provide an adhesive that does not contain any chemical elements that are detrimental to the coating and include a statement to this effect in the submittal concerning the contents as required by State or Federal Laws and Regulations.

Submit to the RCE Manufacturer's certification that the adhesive bonding system, when tested for tension pull-out according to ASTM E 488 utilizing identical anchorages, embedment depths, and concrete strengths as those specified on the Plans, does not fail by any mode listed in Section 12 of ASTM E 488 when loaded to the lesser of 85 percent of the specified bond strength (based on the nominal anchorage diameter and embedment depth) or 90 percent of the yield strength of the anchor. Also, submit to the RCE long term load (creep) test results performed in accordance with ASTM E 1512, ICC-ES AC 58, or ICC-ES AC 308. When specified on the Plans, field testing will also be required for adhesive anchorages.

1.2 Materials

Provide adhesive bonding material systems for structural applications that meet the requirements of ASTM C 881, Type IV, Grade 3, Class B or C (depending on site conditions). Do not use "Fast Set epoxy." Package components of the adhesive in containers of such size that one whole container of each component is used in mixing one batch of adhesive. Use containers of such design that all of the contents may be readily removed, and are well sealed to prevent leakage. Do not use material from containers which are damaged or have been previously opened. Use only full packages of

components. Furnish adhesive material that requires hand mixing in two separate containers designated as Component A and Component B or in a self contained cartridge or capsule that consists of two components which will be automatically mixed as they are dispensed, as in the case of a cartridge, or drilled into, as in the case of a capsule.

Provide packages clearly marked by the Manufacturer with the following information:

- Manufacturer's name and address
- Product Name
- Date of Manufacture
- Expiration Date
- LOT Identification Number
- Storage and Handling Requirements

With each package include the Manufacturer's instructions for anchor and dowel installation. Include the following information with the instructions:

- Diameters of drilled holes for applicable anchor and dowel sizes.
- Cleaning procedure for drilled holes, including a description of permitted and prohibited equipment and techniques.
- Allowable temperature ranges for storage, installation and curing.
- Identification of acceptable mixing/dispensing nozzles.
- Fabrication requirements for anchors and dowels.
- Description of tools permitted or required for installation.
- Method of identifying properly proportioned and mixed adhesive materials.
- Time and temperature schedule for initial set ('gel time') and full-strength cure.
- Requirements for special installation conditions such as horizontal or near horizontal orientation of the anchor or dowel.

1.3 Construction Requirements

1.3.1 Storage

Deliver the adhesive bonding material system to the job-site in original unopened containers with the Manufacturer's label identifying the product. Store materials delivered to the job-site in the original unopened containers within an appropriate facility capable of maintaining storage conditions consistent with the Manufacturer's recommendations.

1.3.2 Installation

Install the adhesive anchors and dowels perpendicular to the plane surface of the structural member, in accordance with Manufacturer's recommendations, and when the concrete is above 40 degrees Fahrenheit and has reached its 28 day strength. Install the anchorages before the adhesive's initial set ('gel time').

1.3.2.1 Drilling of Holes into Concrete

Ensure that concrete members receiving adhesive-bonded anchors or dowels are structurally sound and free of cracks in the vicinity of the anchor or dowel to be installed. When directed by the RCE, use a jig or fixture to ensure the holes are positioned and aligned correctly during the drilling process.

Use a metal detector specifically designed for locating steel in concrete to avoid conflicts with existing steel reinforcement whenever placement tolerances and edge clearances permit. Unless other equipment is recommended by the Manufacturer, drill holes to the diameter required by the Manufacturer using a rotary hammer drill and bit. Perform core drilling to clear existing steel reinforcement only when approved by the RCE. Dry the drilled holes completely prior to cleaning and installing the anchors or dowels. Clean and prepare drilled holes in accordance with the Manufacturer's recommendations, but as a minimum, use oil-free compressed air to remove loose particles from drilling, brush inside surface to free loose particles trapped in pores, then use compressed air again to remove the remaining loose particles. Use a non-metallic bristle brush and avoid over-brushing to prevent polishing the inside surface of the drilled hole. Check each hole with a depth gauge to ensure proper embedment depth. Repair spalled or otherwise damaged concrete using methods approved by the RCE.

1.3.2.2 Inspection of Holes

Inspect each hole immediately prior to placing the adhesive and the anchors/dowels. Ensure all holes are dry and free of dust, dirt, oil, and grease.

1.3.2.3 Mixing of Adhesive

Mix the adhesive in strict conformance with the Manufacturer's instructions.

1.3.2.4 Embedment of Anchors and Dowels

Remove all debris, oils, and any other deleterious material from the anchors and dowels to avoid contamination of the adhesive bonding material. Insert the anchor or dowel the specified depth into the hole and slightly agitate it to ensure wetting and complete encapsulation. After insertion of the anchor or dowel, strike off any excessive adhesive flush with the concrete face. Should the adhesive fail to fill the hole, add additional adhesive to the hole to allow a flush strike-off. Do not disturb the anchors and dowels while adhesive is hardening. For horizontal and inclined installations, provide temporary supports to maintain the alignment of the anchors or dowels until the adhesive bonding material has cured.

1.3.3 Field Testing

When specified on the Plans, field test the installed anchors and dowels. Perform field testing of the installed anchors and dowels in accordance with the applicable sections of ASTM E 488. Inform the RCE and the Manufacturer when the tests will be performed at least 2 days prior to testing. For testing, use a calibrated hydraulic centerhole jack system

that will not damage the anchor or dowel. Place the jack on a plate washer that has a hole at least 1/4" larger than the hole drilled into the concrete. Position the plate washer on center to allow an unobstructed pull. Position the anchors/dowels and the jack on the same axis. Have an approved testing agency calibrate the jack within 6 months prior to testing. Supply the RCE with a certificate of calibration.

Divide the anchors and dowels into LOTs for field testing and acceptance. A LOT consists of anchors or dowels of the same type, diameter, strength, embedment length, and adhesive bonding system. Prior to performing field tests, submit proposed testing locations to the RCE for review, comments, and acceptance. In the presence of the RCE, field test the anchors or dowels for each LOT in accordance with the following:

Test a minimum of 1 anchorage but not less than 10% of all anchors in the LOT to the test load shown on the Plans.

If less than 60 anchorages are to be installed: Install and test the minimum required number of anchorages prior to installing the remaining anchorages. After installing the remaining anchorages, test a minimum of 2 of these anchorages at random locations selected by the RCE.

If more than 60 anchorages are to be installed: Test the first 6 anchorages prior to installing the remaining anchorages. Then test, at random locations selected by the RCE, 10% of the number in excess of 60 anchorages.

For every failed field test, perform two additional field tests on adjacent untested anchors or dowels within the LOT. Continue additional field tests until no more test failures occur, or until all anchors and dowels within the LOT are tested.

Begin testing after the Manufacturer's recommended cure time has been reached. For testing, apply and hold the test load for three minutes. If the jack experiences any drop in gage reading, restart the test. For the anchorage to be deemed satisfactory, hold the test load for three minutes with no movement or drop in gage reading.

Remove all anchors and dowels that fail the field test, without damage to the surrounding concrete. Re-drill holes to remove adhesive bonding material residue and clean the hole in accordance with Subsection 1.3.2.1. For reinstalling replacement anchors or dowels, follow the same procedures as new installations. Do not reuse failed anchors or dowels unless approved by the RCE.

Determine failure of the field test in accordance with ASTM E 488. Submit certified test reports to the RCE. Final acceptance of the adhesively anchored system is based on the conformance of the pull test to the requirements of this Specification. Failure to meet the criteria of this Specification is grounds for rejection.

1.4 Measurement

No separate measurement for payment will be made for furnishing, installing, and testing of adhesively bonded anchors and dowels.

1.5 Payment

Include all costs of adhesively bonded anchors and dowels in the contract unit price bid for the items to be anchored.

SPECIAL PROVISION NO. 11 **CLEANING EXISTING PIPE**

The plans for this project provide for cleaning existing pipe. The contractor shall furnish all equipment, materials and labor necessary to complete the work as directed by the Engineer.

Measurement for payment shall be the actual linear feet of existing pipe satisfactorily cleaned regardless of size.

The contract bid price per linear foot shall be full payment for the completed and accepted work.

SPECIAL PROVISION NO. 12 **ERRATA TO 2007 STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION**

The attached Supplemental Specification dated **January 1, 2008** on page Error! Bookmark not defined. is hereby amended to include the following:

Division 100 is amended as follows:

Page 4, The table in **Subsection 101.2** is amended as follows:

SCDOT OFFICIALS AND OFFICES			
DELETIONS		REPLACEMENTS	
SHE*	State Highway Engineer	DSE*	Deputy Secretary for Engineering

*Wherever it appears in the text, replace the deleted abbreviation with the new abbreviation.

SPECIAL PROVISION NO. 13 **STANDARD DRAWINGS FOR ROADWAY CONSTRUCTION**

The 2008 SCDOT Standard Drawings are effective beginning with the May 2008 letting. These drawings are available for download at http://www.scdot.org/doing/sd_disclaimer.shtml or for purchase through the SCDOT Engineering Publications Sales Center. The Engineering Publication Sales Center is

located in Room G-19 (basement level) of the SCDOT Headquarters Building, 955 Park Street, Columbia, South Carolina.

All references in the plans, standard specifications, supplemental specifications, supplemental technical specifications or special provisions to drawings under the previous numbering system are hereby updated to the new drawing numbers. Refer to sheets 000-205-01 through 000-205-07 to find new drawing numbers when looking for references to older drawing numbers.

The Contractor is hereby notified that the following Standard Drawings are new or have been revised since the last release of the SCDOT Standard Drawings for Road Construction.

These drawings are hereby included in this Contract as Standard Drawings:

Drawing Number	Description
610-105-03	LANE CLOSURE SPEED LIMIT SIGN INSTALLATION DAYTIME INTERSTATE ROUTES
610-110-03	LANE CLOSURE SPEED LIMIT SIGN INSTALLATION NIGHTTIME INTERSTATE ROUTES
610-115-03	DUAL LANE CLOSURE SPEED LIMIT SIGNINSTALLATION INTERSTATE ROUTES
654-110-00	DETAILS OF ROUTE MARKERS & ARROWS
714-000-00	PIPE CULVERTS (PERMANENT)
714-005-00	PIPE CULVERTS (PIPE TRENCH TYPICAL PREPARATION)
714-020-00	PIPE CULVERTS (PIPE TRENCH PREPARATION WHEN IMPROVED FOUNDATION US REQUIRED)
714-105-00	PIPE CULVERTS (RIGID PIPE COMPLETED TRENCH)
714-120-00	PIPE CULVERTS (RIGID PIPE COMPLETED TRENCH WHEN AN IMPROVED FOUNDATION IS REQUIRED)
714-205-00	PIPE CULVERTS (RIGID REINFORCED CONCRETE PIPE (RCP) DETAILS & FILL HEIGHT)
714-505-00	PIPE CULVERTS (FLEXIBLE COMPLETED TYPICAL TRENCH)
714-520-00	PIPE CULVERTS (FLEXIBLE COMPLETED TRENCH WHEN AN IMPROVED FOUNDATION IS REQUIRED)
714-605-00	PIPE CULVERTS (FLEXIBLE CORRUGATED ALUMINUM ALLOY PIPE (CAAP) DETAILS & FILL HEIGHT)
714-610-00	PIPE CULVERTS (FLEXIBLE SPIRAL RIBBED ALUMINUM PIPE (SRAP) DETAILS & FILL HEIGHT)
714-705-00	PIPE CULVERTS (FLEXIBLE HIGH DENSITY POLYETHYLENE (HDPE TYPE S) DETAILS & FILL HEIGHT)

SPECIAL PROVISION NO. 14
QUALIFIED PRODUCT LISTINGS

All references to “Approval Sheet” or “Approval Policy” are to be replaced with “Qualified Products Listings (QPL)” and “Qualified Products Policies (QPP)” respectively. This change includes all references in the SCDOT Standard Drawings, SCDOT Standard Specifications, SCDOT Supplemental Specifications, SCDOT Special Provisions, SCDOT Supplemental Technical Specifications, SCDOT Internet and Intranet websites, and all other documents produced by SCDOT.

SPECIAL PROVISION NO. 15
REQUIRED MEDIA NOTIFICATION FOR CONSTRUCTION PROEJCTS

Contractors are encouraged to co-operate with the news media since all projects are constructed with public funds. Because the scope of this project will cause disruption of normal traffic flow, the Contractor is required to notify the public, in a timely manner, of disruptive activities such as lane closures.

The Contractor is required to utilize area media to accomplish public notification of traffic disruptions.

The Contractor is required to deal directly with the news media and all reasonable efforts should be made to co-operate with the media. However, the safety, security and construction schedule on site should not be disrupted in order to accomplish this. The Contractor may co-ordinate these activities with and receive guidance from the SCDOT Public Affairs Office.

SPECIAL PROVISION NO. 16
CONTRACT PROVISION TO REQUIRE CERTIFICATION AND COMPLIANCE
CONCERNING ILLEGAL ALIENS

By submission of this bid, the bidder as the prime contractor does hereby agree:

- a. to certify its compliance with the requirements of Chapter 14 of Title 8 of the S.C. Code of Laws regarding Unauthorized Aliens and Public Employment;
- b. to provide SCDOT with any documents required to establish such compliance upon request; and
- c. to register and participate and require agreement from subcontractors and sub-subcontractors to register and participate in the federal work authorization program to verify the employment authorization of all new employees, or to employ only workers who supply the documents required pursuant to S.C.Code 8-14-20(B)(2).

SPECIAL PROVISION NO. 17
SUBLETTING OF CONTRACTS (SPECIALTY ITEMS)

The following items of work, when not performed by the Prime Contractor, will be designated as Specialty Items in all contracts in which the item does not constitute thirty percent (30%) or more of the original contract value:

Pavement Markings	Permanent Roadway Signs
Guardrail	Signalization
Milling Asphalt Pavement	Electrical/Lighting
Grassing	Specialized Retaining Walls
Landscaping	Fencing
Erosion Control	Right of Way Surveying
Permanent Construction Signs	Railroad Track Work
Utilities	Jacking and Boring
Contaminated Soil & Tank Removal	Bridge Floor Grooving
Bridge Barrier Walls	Milled Rumble Strips
Traffic Count Stations	Buildings
Drilled Shafts & Casings	Navigational Lighting
Pier Fender Systems	Sound Barrier Walls

SPECIAL PROVISION NO. 18
PARTNERING

(A) Covenant of Good Faith and Fair Dealing

This Contract imposes an obligation of good faith and fair dealing in its performance and enforcement.

The Contractor and Department, with a positive commitment to honesty and integrity, agree to the following mutual duties:

- (1) Each will function within the laws and statutes applicable to their duties and responsibilities.
- (2) Each will avoid hindering the other's performance.
- (3) Each will proceed to fulfill its obligations diligently.
- (4) Each will cooperate in the common endeavor of the Contract.

(B) Partnering

The Department encourages the foundation of cohesive partnering with the Contractor and its principle subcontractors and suppliers. This partnering is not a legal partnership as defined by South Carolina law. Partnering will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance and completion within budget, on schedule, and in accordance with the Contract.

The establishment of a partnering charter will not change the legal relationship of the parties to the contract nor relieve either party from any of the terms of the Contract.

Any cost associated with effectuating partnering will be agreed to by the Department and the Contractor and will be shared equally between them.

SPECIAL PROVISION NO. 19
REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Section 202 is amended as follows:

Page 92 **Subsection 202.5**, item 5, second bullet:
Change the words "brick sidewalk" to "concrete, brick or stone sidewalks".

SPECIAL PROVISION NO. 20
FINE GRADING

Section 208 is amended as follows:

Page 131, **Subsection 208.5**, Paragraph 1, first sentence:
Insert the word "paved" before the word "shoulders".

SPECIAL PROVISION NO. 21
MAINTENANCE STONE

Maintenance Stone used on this project shall conform to the gradation requirements of Section 305, or to the gradation specified for Aggregate No. CR-14 in the Standard Specifications.

SPECIAL PROVISION NO. 22
MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

"The Contractor is hereby advised that the Department has adopted the MUTCD 2003 - Manual on Uniform Traffic Control Devices for use on all projects. All references to the South Carolina Manual on Uniform Traffic Control Devices (SCMUTCD) are hereby revised to read "MUTCD - 2003 Edition".

SPECIAL PROVISION NO. 23
WELD SUBMITTALS AND NOTIFICATION

Section 709.4.3.5.2 is hereby modified as follows:
Delete the last two sentences of the first paragraph and replace them with, "The Department's review and acceptance are required before any field welding will be permitted."

SPECIAL PROVISION NO. 24
PERMANENT PIPE CULVERTS

1 Reinforced Concrete Pipe Culvert (RCP)

1.1 Description (RCP)

This section contains specifications for the materials, construction, measurement, and payment for furnishing reinforced concrete pipe culverts (RCP) of the size, shape, type, and dimensions indicated on the plans and installing them to provide drainage structures at places designated on the plans or by the **RCE** in accordance with these specifications and true to the lines and grades shown on the plans or otherwise given by the **RCE**. This work includes the furnishing and installing of necessary tee, wye, elbow, and bend joints, and making connections to existing and/or new structures, including drilling and chipping as is necessary to complete the work.

1.2 Materials (RCP)

Use only materials specified herein for the several items that constitute the finished pipe culvert. Use only RCP from a qualified manufacturer as indicated on **SCDOT Qualified Product List 69**. Use only joint sealant specified on **SCDOT Qualified Product List 69** with the pipe supplied.

On occasion, the **OMR** may accept RCP that is not stamped, provided certified tests results are submitted for review for each class and size of RCP to include but is not limited to the results from the three edge bearing test for hairline crack (0.01 inch) and the ultimate strength of RCP. All testing will be in accordance to the latest applicable **SCDOT** and **AASHTO** specifications.

Use circular RCP conforming to the applicable requirements of **AASHTO M 170**, for the specified diameters, shapes, types, and strength classes except for the modifications stated herein and on **SCDOT Standard Drawings**. Provide the **RCE** with certification that pipe meets the requirements of **AASHTO M 170**. When a strength class is not specified in the plans, use minimum Class III pipe. Furnish pipe in manufactured lengths from 4 to 12 feet.

Make certain circular pipe meet or exceed the reinforcement requirements of **AASHTO M 170**. Install standard **AASHTO M 170** reinforced pipe within minimum and maximum fill heights shown on **SCDOT Standard Drawings**.

If special designed pipe is required (beyond the fill height limits of the **SCDOT Standard Drawings**), have the manufacturer submit to the **OMR** and the appropriate Structures Engineer a design that meets or exceeds the loading criteria specified on **SCDOT Instructional Bulletin 2007-04** for the design cover height for the project and the pipe material chosen.

Ensure that Portland cement conforms to the requirements of **SCDOT Standard Specifications Subsection 701.2.1**.

The manufacturer may use fly ash and water-granulated blast-furnace slag in accordance with the following requirements:

- A. Fly ash meets **AASHTO M 295** for Type F or C with a maximum Na₂O of 1.5%. Water-granulated blast-furnace slag meets the requirements of **AASHTO M 302**, Grade 100 or better.
- B. Cement may be replaced by fly ash or water-granulated blast-furnace slag in accordance with AASHTO M 170.
- C. Fly ash is allowed only from sources listed on the latest edition of **SCDOT Qualified Product List 3**. Slag is allowed only from sources listed on the latest edition of **SCDOT Qualified Product List 6**. Certified mill test reports are furnished with each shipment to verify compliance requirements.
- D. The manufacturer provides a qualified **OMR** mix design in advance of batching. The submittal indicates the amount of cement removed and the material replacing it.
- E. Storage bins, conveying devices and weighing equipment and procedures to ensure accurate batching provided for each material (fly ash or slag) used.

Make certain that steel reinforcement conforms to the requirements of **AASHTO M 32**, **AASHTO M 55**, **AASHTO M 221**, or **AASHTO M 225** for wire reinforcement as applicable. Use only steel that conforms with the parameters used in the pipe structural calculations supplied for **SCDOT Standard Drawings**. For custom pipe requiring deformed billet steel, use reinforcement that conforms to **ASTM A 706** Grade 60. Ensure that steel conforming to **ASTM A 706** comes from a source listed on **SCDOT Qualified Product List 60**.

Ensure that Rubber Gasket Joint Material meets the requirements of **AASHTO M 315**. Ensure that Preformed Flexible Joint Sealant meets the requirements of **AASHTO M 198**. Use only gasket sources that appear on **SCDOT Qualified Product List 69** with the supplied pipe. Obtain qualification by furnishing the **OMR** a certified affidavit with test results made in a recognized laboratory confirming that the material meets **AASHTO M 198** for preformed flexible joint sealant and **AASHTO M 315** for rubber gaskets, along with complete instructions for installation of the material.

Make certain water meets the requirements of **SCDOT Standard Specifications Subsection 701.2.11**.

When lift holes or lugs are required in pipe, follow OSHA guidelines for handling pipe, and manufacturer guidelines for grouting lift holes after installation.

When geotextile for drainage filtration is required, follow **SCDOT Standard Specifications subsection 804.2.11** and **SCDOT Standard Drawings**.

Use tees, wyes, elbows, bends, reducers, and increasers with strength matching or exceeding the strength of the strongest pipe being connected and with the same joint profile of the connecting pipe. Use tees, wyes, elbows, bends, reducers, and increasers with joint profiles that match connected pipe.

When other than circular designs are used, provide a stencil in the top of the shell marked "Top." Place special design reinforcement in position and stabilize by satisfactory means to ensure that it does not shift or rotate during the manufacturing process.

1.3 Construction Requirements (RCP)

1.3.1 Handling and Storage (RCP)

Inspect pipe before it is installed. Check pipe for proper markings and for signs of damage due to fabrication or shipment. Pipe may be rejected due to improper marking, incorrect pipe class, size, or strength. 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. 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. Defective or damaged joint sealant or gaskets may require replacement, but are not cause for rejection of pipe that meets the above requirements.

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.

1.3.2 Trench for Pipe (RCP)

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. $1.5 \times \text{Pipe OD} + 12''$
2. $\text{Pipe OD} + 24''$
3. $3 \times \text{Pipe OD}$ (only in sections where foundation improvement is required in the plans or by the **RCE**)
4. The width required to safely fit compaction equipment and personnel between the pipe and the trench walls.

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.

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.

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.

Follow OSHA safety requirements for trenching. If trench width or wall slopes are changed due to safety requirements, backfill the trench outside of the normal trench dimensions with either embankment material or backfill material described in **Subsection 1.3.6**.

When supports such as trench boxes are used, ensure that support of the pipe and its embedment are maintained throughout the installation. Ensure that sheeting is sufficiently tight to prevent washing out of native soil from behind the trench box. Follow pipe manufacturer's trench box recommendations in order to comply with OSHA safety requirements while preventing loss of support in the bedding and structural backfill when moving trench boxes. Use sloped trench walls or CLSM when either structural backfill or trench box safety requirements cannot be followed.

Do not disturb the installed pipe and its embedment when moving trench boxes. Do not use trench boxes below the top of the pipe zone unless methods, agreed upon in advance with the RCE, are used for maintaining the integrity of the embedment material. As supports are moved, all voids left by the trench walls below the top of the pipe zone must be filled with specified structural backfill described in **Subsection 1.3.6**, compacted per these specifications.

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.

1.3.2.1 Foundation for Pipe (RCP)

Unless noted otherwise in the plans or by the **RCE**, support pipe using foundation material that meets the minimum requirements of the roadway embankment.

Use the soil boring Standard Penetration Test SPT "N" values and recommendations of **SCDOT Standard Drawings** to determine if additional work is required to prepare an improved foundation. 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 **SCDOT 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 **SCDOT 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.

If poor material is encountered that was not indicated in the plans, contact the **Preconstruction Regional Production Group Design Manager** for instructions on foundation preparation.

1.3.3 Bed for Pipe (RCP)

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 from **Qualified Product List 2**
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)

The same material must be used for bedding and structural backfill unless CLSM is used for structural backfill.

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.

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 minimum requirements that may be increased at the RCE's discretion.

Ensure that trenches are free of water when placing bedding.

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.

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 when measured in accordance to **SC-T-29**. Ensure that compaction of bedding material does not cause the pipe to move.

Vibrate angular stone in place using a minimum of 2 passes with a vibratory plate tamp in lifts not to exceed 12 inches.

Do not use Controlled low strength material (CLSM), flowable fills or concrete for pipe bedding.

1.3.4 Laying Pipe (RCP)

Begin pipe laying at the downstream end of the culvert with the bell or groove ends and outside laps upstream.

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.

When concrete elliptical pipe with circular reinforcement or concrete circular pipe with elliptical or quadrant reinforcement is used, install the pipe in such a position that the manufacturer's marks designating the top or bottom of the pipe are not more than 5 degrees from the vertical plane through the longitudinal axis of the pipe.

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.

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 **RCE**. Where pipe culverts are constructed in conjunction with existing structures, make connections to the satisfaction of the **RCE**.

1.3.5 Joints (RCP)

Use a joint material supplied with the pipe and made by a manufacturer listed on **SCDOT Qualified Product List 69** that corresponds with the type of joint specified in the plans or provided by the pipe manufacturer. Submit joint material manufacturer installation recommendations to **RCE** before installation of pipe. 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.

1.3.5.1 **AASHTO M 198** Preformed Flexible Joint Sealant

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. 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. 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. 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. 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. 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.

1.3.5.2 AASHTO M 315 Rubber Gasket Joint Material

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. 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. Follow pipe manufacturer's recommendations for lubrication of joint and/or gasket. Fit the gasket on the tongue recess. 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. Align the tongue and groove ends of the pipes before joining (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. Seat pipe completely before installing next pipe section.

1.3.6 Pipe Structural Backfill (RCP)

Advise the **RCE** of the time Pipe Structural Backfill operations are expected to begin. If not properly advised, the **RCE** may require the excavation and reinstallation of the structural backfill material.

For structural backfill, use the same material as the pipe bedding (**Subsection 1.3.3**) 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 in **Subsection 1.3.3**.

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.

Ensure that trenches are free of water when placing and compacting structural backfill.

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.

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 Pipe Structural Backfill process does not cause joint separation or displacement of the installed pipe.

Ensure that the compaction of structural backfill is a minimum of 95.0% of the maximum dry density when measured in accordance with **SC-T-29**.

The **RCE** will establish a compaction pattern for the contractor to follow during pipe backfill operations. The pattern will be in effect for production lots of 500 feet of pipe, until the source or classification of backfill material changes, site weather conditions change such as rain, or the compactive efforts being applied change. The compaction pattern will be established by allowing the contractor to apply a 6 inch lift in a 50 foot section until the material has been compacted to 95.0% of the maximum dry density for the structural backfill when measured in accordance with **SC-T-29**. The number of passes and the watering efforts applied to the material will be recorded and this pattern will be considered the compaction pattern.

For pipe smaller than 36 inches in diameter, the **RCE** will run a minimum of one 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, a minimum of 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 is a minimum frequency and should be increased at the **RCE**'s discretion.

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 **RCE** 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 **RCE**'s discretion.

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.

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.

1.3.7 Cover Height (RCP)

Ensure that the minimum and maximum cover is in accordance with the height of cover tables in the **SCDOT Standard Drawings**.

1.3.8 Construction Loads (RCP)

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 **SCDOT 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 **SCDOT**. Repair all damage or displacement at no expense to **SCDOT**.

1.3.9 Structures and End Treatments (RCP)

When not included in the plans, follow **SCDOT Standard Drawings** for connections of pipe to drainage structures, manholes, end treatments, or other buried structures.

Construct end treatment (minimum Class B riprap, pipe end structure, concrete slab, wingwall/apron system, etc.) as indicated in the plans or **SCDOT Standard Drawings**.

When scour issues are observed on site, construct a cast in place concrete cut-off wall a minimum of two feet below the scour depth to protect the end treatment and pipe or as directed by the **RCE**.

1.3.10 Installation Inspection (RCP)

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/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 in

accordance with the frequencies detailed in the Construction Manual. 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 RCE. Additional inspections may be performed until confidence is restored that the installation has been performed in accordance with these specifications.

Post Construction Inspection (Acceptance):

The **RCE** 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.

The **RCE** 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. The **RCE** will perform these inspections with a combination of either:

- A. Video Camera (condition, jointing, & obstructions) & Laser Profiler/Deflectometer (line, grade & shape)
- B. Video Camera (condition, jointing, & obstructions) & Direct Measurement (line & grade) & either 9-Fin Mandrel (shape) for pipes 48-inch diameter and smaller or Direct Measurement (shape) for pipes larger than 48-inch diameter.

These inspections will be performed and submitted by a **SCDOT certified Earthwork, Drainage, & 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 **RCE's** discretion.

When third party surveys and inspections are performed on behalf of the **RCE**, a report will be submitted with the survey and inspection results. This report will include a copy of all video taken from each video camera inspection, 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 **RCE**. The **RCE** 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 **RCE**. This report must address: structural integrity, environmental conditions, design service life of the pipe, and recommended remediation. The **RCE** 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 **RCE** 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.

1.3.11 Installing Pipe Culvert Under Existing Pavement (RCP)

On projects where the original approach pavement structure is being retained, lay the pipe culvert as herein specified. Repair the portion of the pavement structure removed due to the excavation of the trench using the same type of materials used in the original construction. The **RCE** may accept the use of other materials as deemed appropriate. Perform the work to the satisfaction of the **RCE**. Include the cost of the materials and the labor involved in the unit bid price for the pipe culvert.

1.3.12 Placing Pipe Under Railroads and Other Transportation Facilities (RCP)

When the plans include the installation of pipe under railroads or other transportation facilities not under the jurisdiction of the Department, unless otherwise provided, install the pipe using such methods, materials, and procedures required by the owner. There is no extra compensation for this change in methods, materials, and procedures.

1.3.13 Cleaning Out Pipe (RCP)

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.

1.3.14 Trench Backfill for Expedited Construction (RCP)

At the **RCE**'s discretion or where otherwise noted, controlled low strength material (CLSM) may be used as structural backfill and to complete trench backfill for pipe installations in order to expedite the re-opening of the roadway to traffic. The decision should be based on traffic volume, safety and public inconvenience.

CLSM, also known as flowable fill, can be placed to a height not to exceed the subgrade elevation. The remaining pavement structure must be installed according to the pavement typical section. Measurements for payment will be made based on the neat line at a trench width (pipe outside diameter + 12") for the pipe type being installed. Any material used beyond these dimensions is considered incidental to the pipe installation. CLSM shall be installed in accordance with

manufacturer's recommendations to prevent pipe displacement and uplift during CLSM placement.

When CLSM is specified in the plans or special provisions for completion of the trench backfill, CLSM in the pipe embedment zone will be included in the cost of the pipe, and CLSM above the pipe embedment zone will be paid for at the contract unit price for Controlled Low Strength Material.

When CLSM is specified by the **RCE** during construction, all CLSM used in the trench above the pipe springline will be paid for at the contract unit price for Controlled Low Strength Material.

1.4 Measurement (RCP)

The quantity for the items Pipe Culvert, of the size, kind, class, thickness or type specified, or Smooth Wall Pipe Culvert of the size specified is measured in linear feet of the net length of pipe culvert complete in place and accepted.

The quantity of pipe culvert is measured for payment by the length of the centerline of each pipe run, in linear feet (LF), complete and in place. The length is obtained by adding the centerline length of each run of pipe between Drainage Structures and End Treatments.

The quantity for the items pipe culvert tees, wyes, elbows, bends, reducers, and increasers of the size and kind specified is measured by each item.

The quantity for the items pipe culvert beveled ends, flared ends, pipe end structures, wingwall/apron system, and drainage structures is measured by each unit, complete in place and accepted. Do not include the length of beveled ends, flared ends, pipe end structures, wingwall/apron system, or drainage structures in the linear feet of pipe culvert when measured as provided herein.

The quantity of pipe additional foundation work is measured in linear feet along the centerline of the pipe as shown in the **SCDOT Standard Drawings**. Dispose of any unstable material in the manner outlined in **SCDOT Standard Specifications Subsection 203.2.1.5**.

For typical and maximum cover installations shown on **SCDOT Standard Drawings**, no measurement will be made for backfill material shown within the pipe embedment zone, and payment for this material will be included in the cost of the pipe. For shallow and minimum cover installations shown on **SCDOT Standard Drawings**, no measurement will be made for backfill within the pipe trench, and payment for this material will be included in the cost of the pipe.

For installations in cut sections where pipe is deeper than shallow installation, embankment material overfill above the pipe embedment zone will be measured as the volume between the standard trench walls from the top of the pipe embedment zone to the top of the subgrade as shown on the **SCDOT Standard Drawings**.

No measurement will be made for the removal of existing pipe culverts that will be replaced by new culverts. No measurement will be made for pipe inspection.

1.5 Payment (RCP)

Pipe culvert and end treatments, measured as provided in **Subsection 1.4**, are paid for at the contract unit price for the respective items, which price and payment is compensation for furnishing all material, labor, equipment, tools including hauling and placing all pipe sections and materials, excavation of the entire standard trench, bedding, and pipe backfill as described in the measurement section (both structural and embankment backfill in this region), removal of existing pipe to be replaced, constructing pipe joints, removal of old end treatments, cleaning out pipe, disposal of surplus materials, all visual inspection, and all incidentals necessary to complete the work.

The quantities for the items pipe culvert tees, wyes, elbows, bends, reducers, and increasers measured as provided in **Subsection 1.4**, are paid for as each.

The quantity of pipe additional foundation work, measured as provided for in **Subsection 1.4**, is paid for at the contract unit price, which price and payment is compensation for furnishing all material (foundation, extra bedding, extra structural backfill, extra geotextile, etc.), labor (additional trench excavation, compaction, etc.), equipment, tools, hauling, and disposal (of poor material) to complete construction of the pipe foundation, and wider trench as specified in the **SCDOT Standard Drawings**, the plans, or by the **RCE**.

Embankment material overfill in cut sections as described in the measurement section will be paid for as borrow.

All work associated with the excavation, removal and disposal of existing pipe culverts that will be replaced by a new structure will be paid for in the pay item of the new structure.

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

Pay items are listed in **Subsection 5**.

1.6 Referenced Documents (RCP)

SCDOT Standard Specifications for Highway Construction

SCDOT Supplemental Technical Specifications:

SC-T-29

SCDOT Qualified Product Lists:

Qualified Product List 1

Qualified Product List 2

Qualified Product List 3

Qualified Product List 60

Qualified Product List 69

SCDOT Instructional Bulletins:

SCDOT Instructional Bulletin 2007-04

AASHTO Standard Specifications for Transportation Materials & Methods of Sampling and Testing:

AASHTO M 32
AASHTO M 55
AASHTO M 145
AASHTO M 170
AASHTO M 198
AASHTO M 207
AASHTO M 221
AASHTO M 225
AASHTO M 295
AASHTO M 302
AASHTO M 315
AASHTO T 96
AASHTO T 104

ASTM Standard Specifications:

ASTM A 706
ASTM C 443

2 Corrugated Aluminum Alloy & Spiral Ribbed Aluminum Pipe (CAAP&SRAP)

2.1 Description (CAAP&SRAP)

This section contains specifications for the materials, construction, measurement, and payment for furnishing corrugated aluminum alloy pipes (CAAP) and pipe arches and spiral ribbed aluminum pipe (SRAP) of the size, shape, type, and dimensions indicated on the plans and installing them to provide drainage structures at places designated on the plans or by the **RCE** in accordance with these specifications and true to the lines and grades shown on the plans or otherwise given by the **RCE**. This work includes the furnishing and installing of necessary tee, wye, elbow and bend joints, and making connections to existing and/or new structures, including drilling and chipping as is necessary to complete the work.

2.2 Materials (CAAP&SRAP)

Use only materials specified herein for the several items that constitute the finished pipe culvert. Use pipe supplied with joint sealant material and manufactured at a facility listed on **Qualified Product List 68**.

Provide corrugated aluminum alloy pipe, pipe-arch, and spiral ribbed aluminum pipe conforming to **AASHTO M 196**. Provide the **RCE** certification that the pipe meets the requirements of **AASHTO M 196**. Ensure that the thickness of the pipe is in accordance with the plans.

Use sheet that has been marked and conforms to **AASHTO M 197**. Use permanent sheet markings which identify the name or trademark of sheet

manufacturer; alloy and temper; specified thickness or gage; date of manufacture by a six-digit number indicating in order the year, month, and day of the month; and designation number **AASHTO M 197**.

Use a permanent sheet marking method to mark pipe with pipe fabrication information. Mark fabricated pipe with name or trademark of pipe fabricator, date of fabrication of pipe by a six-digit number indicating in order the year, month, and day of the month, designation number **AASHTO M 196**. Align identifying markings with the direction of corrugation and spaced in accordance with **ASTM B 666**.

Mark fittings with the manufacturer's identification symbol and specification designation **AASHTO M 196**.

When geotextile for drainage filtration is required, follow **SCDOT Standard Specifications subsection 804.2.11** and **SCDOT Standard Drawings**.

If special designed pipe is required (beyond the fill height limits of the **SCDOT Standard Drawings**), have the manufacturer submit to the **OMR** and the appropriate Structures Engineer a design that meets or exceeds the loading criteria specified on **SCDOT Instructional Bulletin 2007-04** for the design cover height for the project and the pipe material chosen.

Use tees, wyes, elbows, bends, reducers, and increasers with strength matching or exceeding the strength of the strongest pipe being connected and with the same joint profile of the connecting pipe. Use tees, wyes, elbows, bends, reducers, and increasers with joint profiles that match connected pipe.

2.3 Construction Requirements (CAAP&SRAP)

2.3.1 Handling and Storage (CAAP&SRAP)

Inspect pipe before it is installed. Check pipe for proper markings and for signs of damage due to fabrication or shipment. Pipe may be rejected due to improper marking, incorrect pipe gage, corrugation, size, or strength. Pipe may also be rejected due to damage which may include, but is not limited to dents, tears, gaps, or deformations that would adversely affect the strength or function of the pipe. Damage to the end of the pipe including open seams (particularly at rerolled ends) or ends not normal to the walls or centerline of the pipe that prevent satisfactory joint installation may also be rejected. Defective or damaged gaskets may require replacement, but are not cause for rejection of pipe that meets the above requirements.

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. Ensure that fittings and other components are lifted and moved safely using appropriate unloading and handling equipment.

2.3.2 Trench for Pipe (CAAP&SRAP)

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. $1.5 \times \text{Pipe OD} + 12''$
2. $\text{Pipe OD} + 24''$
3. $3 \times \text{Pipe OD}$ (only in sections where foundation improvement is required in the plans or by the **RCE**)

4. The width required to safely fit compaction equipment and personnel between the pipe and the trench walls.

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.

Where pipe culverts 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.

When excavating for pipe culverts, 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.

Follow OSHA safety requirements for trenching. If trench width or wall slopes are changed due to safety requirements, backfill the trench outside of the normal trench dimensions with either embankment material or backfill material described in **Subsection 2.3.6**.

When supports such as trench boxes are used, ensure that support of the pipe and its embedment are maintained throughout the installation. Ensure that sheeting is sufficiently tight to prevent washing out of native soil from behind the trench box. Follow pipe manufacturer's trench box recommendations in order to comply with OSHA safety requirements while preventing loss of support in the bedding and structural backfill when moving trench boxes. Use sloped trench walls or CLSM when either structural backfill or trench box safety requirements cannot be followed.

Do not disturb the installed pipe and its embedment when moving trench boxes. Do not use trench boxes below the top of the pipe zone unless methods, agreed upon in advance with the RCE, are used for maintaining the integrity of the embedment material. As supports are moved, all voids left by the trench walls below the top of the pipe zone must be filled with specified structural backfill described in **Subsection 2.3.6**, compacted per these specifications.

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.

2.3.2.1 Foundation for Pipe (CAAP&SRAP)

Unless noted otherwise in the plans or by the **RCE**, support pipe using foundation material that meets the minimum requirements of the roadway embankment.

Use the soil boring Standard Penetration Test SPT “N” values and recommendations of **SCDOT Standard Drawings** to determine if additional work is required to prepare an improved foundation. 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 **SCDOT 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 **SCDOT 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.

If poor material is encountered that was not indicated in the plans, contact the **Preconstruction Regional Production Group Design Manager** for instructions on foundation preparation.

2.3.3 Bed for Pipe (CAAP&SRAP)

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 from **Qualified Product List 2**
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)

The same material must be used for bedding and structural backfill unless CLSM is used for structural backfill.

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.

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 minimum requirements that may be increased at the RCE's discretion.

Ensure that trenches are free of water when placing bedding.

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.

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 when measured in accordance to **SC-T-29**. Ensure that compaction of bedding material does not cause the pipe to move.

Vibrate angular stone in place using a minimum of 2 passes with a vibratory plate tamp in lifts not to exceed 12 inches.

Do not use controlled low strength material (CLSM), flowable fills or concrete for pipe bedding.

2.3.4 Laying Pipe (CAAP&SRAP)

Begin pipe laying at the downstream end of the culvert.

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 joints have been properly accommodated. Remove pipe that settles before final acceptance or which is not in alignment and re-lay without extra compensation.

Prior to being lowered into the trench, closely examine corrugated metal pipe sections and fit so that they will form a true line of pipe when in place. Do not use sections that do not fit together properly.

Place distorted circular metal pipes with the major axis vertical. If rods, struts, or other means are used to maintain pipe distortion, do not remove them before the completion of the embankment unless otherwise permitted by the **RCE**.

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.

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 **RCE**. Where pipe culverts are constructed in conjunction with existing structures, make connections to the satisfaction of the **RCE**.

2.3.5 Joints (CAAP&SRAP)

For CAAP & SRAP, submit joint material manufacturer installation recommendations to **RCE** before installation of pipe. 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.

ASTM D 1056 Joints (CAAP&SRAP)

For CAAP and SRAP, rerolled pipe ends with annular corrugations are allowed. Use fully corrugated aluminum coupling bands with either welded angle brackets or bar bolt and strap connections that conform to the requirements of **AASHTO M 196** article 9 unless specified otherwise in the plans. Provide coupling bands and connections that match the configuration used during the joint testing and indicated on **Qualified Product List 68**. Use minimum 1/2 inch diameter galvanized **ASTM A 307** bolts and nuts to connect all size coupling bands and follow minimum quantity requirements shown on **SCDOT Standard Drawings**. Use closed cell expanded rubber strip or sleeve gaskets conforming to **ASTM D 1056**.

Manufacturer must certify that the pipe, coupling band, and gasket combination meets the laboratory 10 psi pressure test. Each manufacturer may also elect to test their pipe joints to 13 psi for use in locations where RCP AASHTO M 315 joints are currently specified. Both 10 psi and 13 psi tests are to be conducted in straight alignment with the pipe deflected 5%. The laboratory tests are 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. Make certain that the strip or sleeve gaskets are at least as wide as the coupling band (12 inches minimum) and approximately 3/8 inch thick minimum. Rubber O-ring gaskets are not allowed since they are not visible from the inside of the pipe after installation.

Carefully clean pipe ends to remove all debris that could hinder proper sealing of the pipe and gasket. Liberally lubricate gaskets and outside pipe surfaces in contact with the gasket using a lubricant specified by the gasket manufacturer. Lubricate the inside surfaces of the coupling band, check for proper position, and adjust if required to match corrugations. If necessary, fold gasket over itself to allow placement of joining pipe, then unfold over newly placed pipe. Snap the gasket several times to allow for final seating. Confirm that the separation between pipe ends is less than one corrugation of the coupling band and that no foreign matter is present between the gasket and the pipe/coupling band surfaces. Pull coupling band ends together using a long bolt if needed to start the band lap. Make sure that coupling band corrugations align with corrugations of pipe. When helical corrugations are used, if necessary, rotate coupling band to align with previously installed pipe or rotate newly installed pipe to align with coupling band. Insert final bolts and tighten to snug tight conditions (approximately 25-30 ft-lb of torque) or manufacturer recommendations. Tap the band with a rubber mallet during tightening to ensure uniform seating of the gasket. Ensure that band

corrugations are fully seated into corrugations of both pipes before proceeding to next pipe connection.

2.3.6 Pipe Structural Backfill (CAAP&SRAP)

Advise the **RCE** of the time Pipe Structural Backfill operations are expected to begin. If not properly advised, the **RCE** may require the excavation and reinstallation of the structural backfill material.

For structural backfill, use the same material as the pipe bedding (**Subsection 2.3.3**) 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 in **Subsection 2.3.3**.

Controlled low strength material (CLSM) and controlled density fill are flowable fills which 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.

Ensure that trenches are free of water when placing and compacting structural backfill.

Thoroughly compact the structural backfill material 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.

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 Pipe Structural Backfill process does not cause joint separation or displacement of the installed pipe.

Ensure that the compaction of structural backfill is a minimum of 95.0% of the maximum dry density when measured in accordance with **SC-T-29**.

The **RCE** will establish a compaction pattern for the contractor to follow during pipe backfill operations. The pattern will be in effect for production lots of 500 feet of pipe, until the source or classification of backfill material changes, site weather conditions change such as rain, or the compactive efforts being applied change. The compaction pattern will be established by allowing the contractor to apply a 6 inch lift in a 50 foot section until the material has been compacted to 95.0% of the maximum dry density for the structural backfill when measured in accordance with **SC-T-29**. The number of passes and the watering efforts applied

to the material will be recorded and this pattern will be considered the compaction pattern.

For pipe smaller than 36 inches in diameter, the **RCE** will run a minimum of one 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, a minimum of 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 is a minimum frequency and should be increased at the **RCE**'s discretion.

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 **RCE** 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 **RCE**'s discretion.

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.

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.

2.3.7 Cover Height (CAAP&SRAP)

Ensure that the minimum and maximum cover is in accordance with the height of cover tables in the **SCDOT Standard Drawings**.

2.3.8 Construction Loads (CAAP&SRAP)

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 **SCDOT 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 **SCDOT**. Repair all damage or displacement at no expense to **SCDOT**.

2.3.9 Structures and End Treatments (CAAP&SRAP)

When not included in the plans, follow **SCDOT Standard Drawings** for connections of pipe to drainage structures, manholes, end treatments, or other buried structures.

Construct end treatment (minimum Class B riprap, pipe end structure, concrete slab, wingwall/apron system, etc.) as indicated in the plans or **SCDOT Standard Drawings**.

When scour issues are observed on site, construct a cast in place concrete cut-off wall a minimum of two feet below the scour depth to protect the end treatment and pipe or as directed by the **RCE**.

2.3.10 Installation Inspection (CAAP&SRAP)

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/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 in accordance with the frequencies detailed in the Construction Manual. 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 RCE. Additional inspections may be performed until confidence is restored that the installation has been performed in accordance with these specifications.

Post Construction Inspection (Acceptance):

The **RCE** 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.

The **RCE** 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. The **RCE** will perform these inspections with a combination of either:

- A. Video Camera (condition, jointing, & obstructions) & Laser Profiler/Deflectometer (line, grade & shape)
- B. Video Camera (condition, jointing, & obstructions) & Direct Measurement (line & grade) & either 9-Fin Mandrel (shape) for pipes 48-inch diameter and smaller or Direct Measurement (shape) for pipes larger than 48-inch diameter.

These inspections will be performed and submitted by a **SCDOT certified Earthwork, Drainage, & 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 **RCE's** discretion.

When third party surveys and inspections are performed on behalf of the **RCE**, a report will be submitted with the survey and inspection results. This report will include a copy of all video taken from each video camera inspection, 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 **RCE**. The **RCE** 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 aluminum pipe, when pipe distress such as cracking, wall damage (dents, bulges, creases, cracks and tears) and deflection or poorly shaped cross-section are present in the pipe, prepare a report for submittal to the **RCE**. This report must address: structural integrity, environmental conditions, design service life of the pipe, and recommended remediation. Upon acceptance of the report by the **RCE**, and at a minimum, implement the following: Replace, repair or remediate locations as recommended in the report or by the **RCE**.

For aluminum pipe, when installed pipe deflections exceed 5.0% of the inside diameter, prepare a report for submittal to the **RCE**. This report must address: structural integrity, environmental conditions, design service life of the pipe, and recommended remediation. Upon acceptance by the **RCE**, and at a minimum, implement the following: Replace the pipe at locations where the measured deflection exceeds 7.5% of the nominal inside diameter of the pipe. Repair or remediate locations as recommended in the report or by the **RCE**. Replace locations where directed by the **RCE**.

2.3.11 Installing Pipe Culvert Under Existing Pavement (CAAP&SRAP)

On projects where the original approach pavement structure is being retained, lay the pipe culvert as herein specified. Repair the portion of the pavement structure removed due to the excavation of the trench using the same type of materials used in the original construction. The **RCE** may accept the use of other materials as deemed appropriate. Perform the work to the satisfaction of the **RCE**. Include the cost of the materials and the labor involved in the unit bid price for the pipe culvert.

2.3.12 Placing Pipe Under Railroads and Other Transportation Facilities (CAAP&SRAP)

When the plans include the installation of pipe under railroads or other transportation facilities not under the jurisdiction of the Department, unless otherwise provided, install the pipe using such methods, materials, and procedures

required by the owner. There is no extra compensation for this change in methods, materials, and procedures.

2.3.13 Cleaning Out Pipe (CAAP&SRAP)

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.

2.3.14 Trench Backfill for Expedited Construction (CAAP&SRAP)

At the RCE's discretion or where otherwise noted, CLSM may be used as structural backfill and to complete trench backfill for pipe installations in order to expedite the reopening of the roadway to traffic. The decision should be based on traffic volume, safety and public inconvenience.

CLSM can be placed to a height not to exceed the subgrade elevation. The remaining pavement structure must be installed according to the pavement typical section. Measurements for payment will be made based on the neat line at a trench width (pipe outside diameter + 12") for the pipe type being installed. Any material used beyond these dimensions is considered incidental to the pipe installation. CLSM shall be installed in accordance with manufacturer's recommendations to prevent pipe displacement and uplift during CLSM placement.

When CLSM is specified in the plans or special provisions for completion of the trench backfill, CLSM in the pipe embedment zone will be included in the cost of the pipe, and CLSM above the pipe embedment zone will be paid for at the contract unit price for Controlled Low Strength Material.

When CLSM is specified by the **RCE** during construction, all CLSM used in the trench above the pipe springline will be paid for at the contract unit price for Controlled Low Strength Material.

2.4 Measurement (CAAP&SRAP)

The quantity for the items pipe culvert, of the size, kind, class, thickness or type specified, or Smooth or Corrugated Wall Pipe Culvert of the size specified is measured in linear feet of the net length of pipe culvert complete in place and accepted.

The quantity of pipe culvert is measured for payment by the length of the centerline of each pipe run, in linear feet (LF), complete and in place. The length is obtained by adding the centerline length of each run of pipe between drainage structures and end treatments.

The quantity for the items pipe culvert tees, wyes, elbows, bends, reducers, and increasers of the size and kind specified is measured by each item.

The quantity for the items pipe culvert beveled ends, flared ends, pipe end structures, wingwall/apron system, and drainage structures is measured by each unit, complete in place and accepted. Do not include the length of beveled ends, flared ends, pipe end structures, wingwall/apron system, or drainage structures in the linear feet of pipe culvert when measured as provided herein.

The quantity of pipe additional foundation work is measured in linear feet along the centerline of the pipe as shown in the **SCDOT Standard Drawings**. Dispose of any unstable material in the manner outlined in **SCDOT Standard Specifications Subsection 203.2.1.5**.

For typical and maximum cover installations shown on **SCDOT Standard Drawings**, no measurement will be made for backfill material shown within the pipe embedment zone, and payment for this material will be included in the cost of the pipe. For shallow and minimum cover installations shown on **SCDOT Standard Drawings**, no measurement will be made for backfill within the pipe trench, and payment for this material will be included in the cost of the pipe.

For installations in cut sections where pipe is deeper than shallow installation, embankment material overfill above the pipe embedment zone will be measured as the volume between the standard trench walls from the top of the pipe embedment zone to the top of the subgrade as shown on the **SCDOT Standard Drawings**.

No measurement will be made for the removal of existing pipe culverts that will be replaced by new culverts. No measurement will be made for pipe inspection.

2.5 Payment (CAAP&SRAP)

Pipe culvert and end treatments measured as provided in **Subsection 2.4**, are paid for at the contract unit price for the respective items, which price and payment is compensation for furnishing all material, labor, equipment, tools including hauling and placing all pipe sections and materials, excavation of the entire standard trench, bedding, and pipe structural backfill as described in the measurement section, removal of existing pipe to be replaced, constructing pipe joints, removal of old end treatments, cleaning out pipe, disposal of surplus materials, all visual inspection, and all incidentals necessary to complete the work.

The quantities for the items pipe culvert tees, wyes, elbows, bends, reducers, and increasers measured as provided in **Subsection 2.4**, are paid for as each.

The quantity of pipe additional foundation work, measured as provided for in **Subsection 2.4**, is paid for at the contract unit price, which price and payment is compensation for furnishing all material (foundation, extra bedding, extra structural backfill, extra geotextile, etc.), labor (additional trench excavation, compaction, etc.), equipment, tools, hauling, and disposal (of poor material) to complete construction of the pipe foundation, and wider trench as specified in the **SCDOT Standard Drawings**, the plans, or by the **RCE**.

Embankment material overfill in cut sections as described in the measurement section will be paid for as borrow.

All work associated with the excavation, removal and disposal of existing pipe culverts that will be replaced by a new structure will be paid for in the pay item of the new structure.

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

Pay items are listed in **Subsection 5**.

2.6 Referenced Documents (CAAP&SRAP)

SCDOT Standard Specifications for Highway Construction

SCDOT Supplemental Technical Specifications:

SC-T-29

SCDOT Instructional Bulletins:

SCDOT Instructional Bulletin 2007-04

SCDOT Qualified Product List:

Qualified Product List 2

Qualified Product List 68

AASHTO Standard Specifications for Transportation Materials & Methods of Sampling and Testing:

AASHTO M 145

AASHTO M 196

AASHTO M 197

ASTM Standard Specifications:

ASTM A 307

ASTM B 666

ASTM D 1056

3 Corrugated High Density Polyethylene Pipe Culvert (HDPE)

3.1 Description (HDPE)

This section contains specifications for the materials, construction, measurement, and payment for furnishing corrugated high density polyethylene pipe culvert (HDPE) of the size, shape, type, and dimensions indicated on the plans and installing them to provide drainage structures at places designated on the plans or by the **RCE** in accordance with these specifications and true to the lines and grades shown on the plans or otherwise given by the **RCE**. This work includes the furnishing and installing of necessary tee, wye, elbow, and bend joints, and making connections to existing and/or new structures, including drilling and chipping as is necessary to complete the work.

3.2 Materials (HDPE)

Provide corrugated high density polyethylene pipe culvert conforming to the requirements of **AASHTO M 294**, Type S, as required. Use pipe supplied with joint sealant material and manufactured at a facility listed on **Qualified Product List 30**.

For **AASHTO M 294**, Type S pipe, provide pipe with an outer corrugated high density pipe wall and a smooth inner liner. Use only **AASHTO M 294**, Type S pipe in permanent applications.

Use only materials from sources complying with the **SCDOT Qualified Product Policy 30** and appearing on the **SCDOT Qualified Product List 30**.

Have manufacturer furnish with each shipment of materials a certification showing brand name, the shipping date and to whom it is shipped, and the quantity and size of pipe represented. Ensure that the certificate contains a statement that the material meets the **SCDOT** specifications and is essentially the same as that qualified by the Department. Ensure that the shipped pipe is plainly marked with the manufacturer's name, trademark, nominal size, specification designation **AASHTO M 294**, plant designation code, the date of manufacture or an appropriate code, and certification stamp from NTPEP. Ensure that the shipped fittings are plainly marked with the manufacturer's identification symbol and specification designation **AASHTO M 294**. Furnish a materials safety data sheet and installation instructions with each shipment. Ensure that all HDPE pipe is certified by **AASHTO NTPEP** third party certification programs.

When geotextile for drainage filtration is required, follow **SCDOT Standard Specifications subsection 804.2.11** and **SCDOT Standard Drawings**.

If special designed pipe is required (beyond the fill height limits of the **SCDOT Standard Drawings**), have the manufacturer submit to the **OMR** and the appropriate Structures Engineer a design that meets or exceeds the loading criteria specified on **SCDOT Instructional Bulletin 2007-04** for the design cover height for the project and the pipe material chosen.

Use tees, wyes, elbows, bends, reducers, and increasers with strength matching or exceeding the strength of the strongest pipe being connected and with the same joint profile of the connecting pipe. Use tees, wyes, elbows, bends, reducers, and increasers with joint profiles that match connected pipe.

3.3 Construction Requirements (HDPE)

3.3.1 Handling and Storage (HDPE)

Inspect pipe before it is installed. Check pipe for proper markings and for signs of damage due to fabrication or shipment. Pipe may be rejected due to improper marking, incorrect pipe type, size, or strength. Pipe may also be rejected due to damage which may include, but is not limited to cuts, gouges, delaminations, bulges, flat areas, bubbles, dents, tears, breaks, gaps, missing or malformed corrugations, or deformations that would adversely affect the strength or function of the pipe. Damage to the end of the pipe including damage to bell or spigot, or ends that are not normal to the walls or centerline of the pipe that prevent satisfactory joint installation may also be rejected. Defective or damaged gaskets may require replacement, but are not cause for rejection of pipe that meets the above requirements.

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.

3.3.2 Trench for Pipe (HDPE)

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. $1.5 \times \text{Pipe OD} + 12''$
2. $\text{Pipe OD} + 24''$
3. $3 \times \text{Pipe OD}$ (only in sections where foundation improvement is required in the plans or by the **RCE**)
4. The width required to safely fit compaction equipment and personnel between the pipe and the trench walls.

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.

Where pipe culverts 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.

When excavating for pipe culverts, 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.

Follow OSHA safety requirements for trenching. If trench width or wall slopes are changed due to safety requirements, backfill the trench outside of the normal trench dimensions with either embankment material or backfill material described in **Subsection 1.3.6**.

When supports such as trench boxes are used, ensure that support of the pipe and its embedment are maintained throughout the installation. Ensure that sheeting is sufficiently tight to prevent washing out of native soil from behind the trench box. Follow pipe manufacturer's trench box recommendations to comply with OSHA safety requirements while preventing loss of support in the bedding and structural backfill when moving trench boxes. Use sloped trench walls or CLSM when either structural backfill or trench box safety requirements cannot be followed.

Do not disturb the installed pipe and its embedment when moving trench boxes. Do not use trench boxes below the top of the pipe zone unless methods, agreed upon in advance with the **RCE**, are used for maintaining the integrity of the embedment material. As supports are moved, all voids left by the trench walls below the top of the pipe zone must be filled with specified structural backfill described in **Subsection 3.3.6**, compacted per these specifications.

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.

3.3.2.1 Foundation for Pipe (HDPE)

Unless noted otherwise in the plans or by the **RCE**, support pipe using foundation material that meets the minimum requirements of the roadway embankment.

Use the soil boring Standard Penetration Test SPT “N” values and recommendations of **SCDOT Standard Drawings** to determine if additional work is required to prepare an improved foundation. 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 **SCDOT 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 **SCDOT 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.

If poor material is encountered that was not indicated in the plans, contact the **Preconstruction Regional Production Group Design Manager** for instructions on foundation preparation.

3.3.3 Bed for Pipe (HDPE)

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 from **Qualified Product List 2**
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)

The same material must be used for bedding and structural backfill unless CLSM is used for structural backfill.

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.

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 minimum requirements that may be increased at the RCE's discretion.

Ensure that trenches are free of water when placing bedding.

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.

Compact bedding material that is outside of the middle third pipe diameter 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 when measured in accordance to **SC-T-29**. Ensure that compaction of bedding material does not cause the pipe to move.

Vibrate angular stone in place using a minimum of 2 passes with a vibratory plate tamp in lifts not to exceed 12 inches.

Do not use controlled low strength material (CLSM), flowable fills or concrete for pipe bedding.

3.3.4 Laying Pipe (HDPE)

Begin pipe laying at the downstream end of the culvert with the bell or groove ends and outside laps upstream.

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.

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.

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 of connection details, use a standard drainage structure or designed interface as directed by the **RCE**. Where pipe culverts are constructed in conjunction with existing structures, make connections to the satisfaction of the **RCE**.

3.3.5 Joints (HDPE)

Submit joint material manufacturer installation recommendations to **RCE** before installation of pipe. Follow joint material manufacturer's recommendations for installation procedure. Follow pipe manufacturer's recommendations for proper joint seating. Follow **ASTM D 2321** for joint installation procedures. Order pipe and appropriate joint material from pipe manufacturer.

3.3.5.1 Standard Joint

Use a bell and spigot type connection with an elastomeric rubber seal meeting **ASTM F477** and meeting the requirements specified in the plan and by the pipe manufacturer. Ship pipe with gasket installed. Certify that the pipe and gasket system meet or exceed the laboratory 10 psi internal pressure test of **ASTM D 3212**. Each manufacturer may also elect to test their pipe joints to 13 psi for use in locations where RCP AASHTO M 315 joints are currently specified. Both 10 psi and 13 psi tests are to be conducted in straight alignment with the pipe deflected 5%. The laboratory tests are 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. Provide, to the **RCE**, manufacturer's certification that gaskets are manufactured in accordance with the requirements of **ASTM F 477** and do not have any visible cracking when tested according to **ASTM D 1149**. Store bell and spigot type pipe in alternating rows to prevent bell flattening. Cover gaskets with a protective wrap during storage to prevent damage to the gasket. Inspect pipe to ensure that pipe joint components are clean and free from damage or defect before installation. Mark or verify that the pipe ends are marked to indicate the insertion stop position. If pipe bell is manufactured separately from pipe, ensure it is securely installed before proceeding with installation. Lubricate inside and leading edge of bell with a lubricant, specified by the pipe manufacturer, that does not cause damage or deterioration to the gasket material. Use installation methods that do not damage pipe, bell, spigot or gasket. Push the spigot end of the pipe being laid into the bell end of the pipe already installed up to the marked insertion stop point while maintaining true line and grade. Follow manufacturer recommendations on construction devices to use to prevent damage to the pipe. Do not use excessive force that may result in over-assembled joints or dislodged gaskets. If pipe is not fully installed to the marked insertion point, disassemble joints, clean and reinstall joint as described above. Ensure that pipe installed has proper line and grade before installing next pipe section.

3.3.5.2 Field Fabricated Joint

Use field fabricated joints only outside of roadbed and driveways. Splice two field cut pieces of HDPE pipe, using a split coupler band with an elastomeric rubber seal meeting **ASTM F 477**.

Wrap entire joint with a geotextile for drainage filtration to prevent the migration of soils into the pipe or to meet a silt tight designation per **AASHTO M 294**. Geotextile fabric shall extend 12 inches either side of the joint and overlap at least 18 inches. No additional payment will be made for the use and installation of split coupler bands.

3.3.6 Pipe Structural Backfill (HDPE)

Advise the **RCE** of the time Pipe Structural Backfill operations are expected to begin. If not properly advised, the **RCE** may require the excavation and reinstallation of the structural backfill material.

For structural backfill, use the same material as the pipe bedding (**Subsection 3.3.3**) 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 in **subsection 3.3.3**.

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.

Ensure that trenches are free of water when placing and compacting structural backfill.

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.

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 Pipe Structural Backfill process does not cause joint separation or displacement of the installed pipe.

Ensure that the compaction of structural backfill is a minimum of 95.0% of the maximum dry density when measured in accordance with **SC-T-29**.

The **RCE** will establish a compaction pattern for the contractor to follow during pipe backfill operations. The pattern will be in effect for production lots of 500 feet of pipe, until the source or classification of backfill material changes, site weather conditions change such as rain, or the compactive efforts being applied change. The compaction pattern will be established by allowing the contractor to apply a 6 inch lift in a 50 foot section until the material has been compacted to 95.0% of the maximum dry density for the structural backfill when measured in accordance with **SC-T-29**. The number of passes and the watering efforts applied to the material will be recorded and this pattern will be considered the compaction pattern.

For pipe smaller than 36 inches in diameter, the **RCE** will run a minimum of one 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, a minimum of 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 is a minimum frequency and should be increased at the **RCE's** discretion.

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 RCE 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 **RCE's** discretion.

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.

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.

3.3.7 Cover Height (HDPE)

Ensure that the minimum and maximum cover is in accordance with the height of cover tables in the **SCDOT Standard Drawings**.

3.3.8 Construction Loads (HDPE)

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 **SCDOT 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 **SCDOT**. Repair all damage or displacement at no expense to **SCDOT**.

3.3.9 Structures and End Treatments (HDPE)

When not included in the plans, follow **SCDOT Standard Drawings** for connections of pipe to drainage structures, manholes, end treatments, or other buried structures.

Construct end treatment (minimum Class B riprap, pipe end structure, concrete slab, wingwall/apron system, etc.) as indicated in the plans or **SCDOT Standard Drawings**.

When scour issues are observed on site, construct a cast in place concrete cut-off wall a minimum of two feet below the scour depth to protect the end treatment and pipe or as directed by the **RCE**.

3.3.10 Installation Inspection (HDPE)

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/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 in accordance with the frequencies detailed in the Construction Manual. 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 RCE. Additional inspections may be performed until confidence is restored that the installation has been performed in accordance with these specifications.

Post Construction Inspection (Acceptance):

The **RCE** 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.

The **RCE** 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. The **RCE** will perform these inspections with a combination of either:

- A. Video Camera (condition, jointing, & obstructions) & Laser Profiler/Deflectometer (line, grade & shape)
- B. Video Camera (condition, jointing, & obstructions) & Direct Measurement (line & grade) & either 9-Fin Mandrel (shape) for pipes 48-inch diameter and smaller or Direct Measurement (shape) for pipes larger than 48-inch diameter.

These inspections will be performed and submitted by a **SCDOT certified Earthwork, Drainage, & 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 **RCE's** discretion.

When third party surveys and inspections are performed on behalf of the **RCE**, a report will be submitted with the survey and inspection results. This report will include a copy of all video taken from each video camera inspection, 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 **RCE**. The **RCE** 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 HDPE pipe, when installed pipe deflections exceed 5.0% of the inside diameter, prepare a report for submittal to the **RCE**. This report must address: structural integrity, environmental conditions, design service life of the pipe, and recommended remediation. Upon acceptance by the **RCE**, and at a minimum, implement the following: Replace the pipe at locations where the measured deflection exceeds 7.5% of the nominal inside diameter of the pipe. Repair or remediate locations as recommended in the report or by the **RCE**. Replace locations where directed by the **RCE**.

3.3.11 Installing Pipe Culvert Under Existing Pavement (HDPE)

On projects where the original approach pavement structure is being retained, lay the pipe culvert as herein specified. Repair the portion of the pavement structure removed due to the excavation of the trench using the same type of materials used in the original construction. The **RCE** may accept the use of other materials as deemed appropriate. Perform the work to the satisfaction of the **RCE**. Include the cost of the materials and the labor involved in the unit bid price for the pipe culvert.

3.3.12 Placing Pipe Under Railroads and Other Transportation Facilities (HDPE)

When the plans include the installation of pipe under railroads or other transportation facilities not under the jurisdiction of the Department, unless otherwise provided, install the pipe using such methods, materials, and procedures required by the owner. There is no extra compensation for this change in methods, materials, and procedures.

3.3.13 Cleaning Out Pipe (HDPE)

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.

3.3.14 Trench Backfill for Expedited Construction (HDPE)

At the **RCE**'s discretion or where otherwise noted, CLSM may be used as structural backfill and to complete trench backfill for pipe installations in order to expedite the re-opening of the roadway to traffic. The decision should be based on traffic volume, safety and public inconvenience.

CLSM can be placed to a height not to exceed the subgrade elevation. The remaining pavement structure must be installed according to the pavement typical section. Measurements for payment will be made based on the neat line at a trench width (pipe outside diameter + 12") for the pipe type being installed. Any material used beyond these dimensions is considered incidental to the pipe installation. CLSM shall be installed in accordance with manufacturer's

recommendations to prevent pipe displacement and uplift during CLSM placement.

When CLSM is specified in the plans or special provisions for completion of the trench backfill, CLSM in the pipe embedment zone will be included in the cost of the pipe, and CLSM above the pipe embedment zone will be paid for at the contract unit price for Controlled Low Strength Material.

When CLSM is specified by the **RCE** during construction, all CLSM used in the trench above the pipe springline will be paid for at the contract unit price for Controlled Low Strength Material.

3.4 Measurement (HDPE)

The quantity for the items pipe culvert, of the size, kind, class, thickness or type specified, or Smooth Wall Pipe Culvert of the size specified is measured in linear feet of the net length of pipe culvert complete in place and accepted.

The quantity of pipe culvert is measured for payment by the length of the centerline of each pipe run, in linear feet (LF), complete and in place. The length is obtained by adding the centerline length of each run of pipe between Drainage Structures and End Treatments.

The quantity for the items pipe culvert tees, wyes, elbows, bends, reducers, and increasers of the size and kind specified is measured by each item.

The quantity for the items pipe culvert beveled ends, flared ends, pipe end structures, wingwall/apron system, and drainage structures is measured by each unit, complete in place and accepted. Do not include the length of beveled ends, flared ends, pipe end structures, wingwall/apron system, or drainage structures in the linear feet of pipe culvert when measured as provided herein.

The quantity of pipe additional foundation work is measured in linear feet along the centerline of the pipe as shown in the **SCDOT Standard Drawings**. Dispose of any unstable material in the manner outlined in **SCDOT Standard Specifications Subsection 203.2.1.5**.

For typical and maximum cover installations shown on **SCDOT Standard Drawings**, no measurement will be made for backfill material shown within the pipe embedment zone, and payment for this material will be included in the cost of the pipe. For shallow and minimum cover installations shown on **SCDOT Standard Drawings**, no measurement will be made for backfill within the pipe trench, and payment for this material will be included in the cost of the pipe.

For installations in cut sections where pipe is deeper than shallow installation, embankment material overfill above the pipe embedment zone will be measured as the volume between the standard trench walls from the top of the pipe embedment zone to the top of the subgrade as shown on the **SCDOT Standard Drawings**.

No measurement will be made for the removal of existing pipe culverts that will be replaced by new culverts. No measurement will be made for pipe inspection.

3.5 Payment (HDPE)

Pipe culvert and end treatments measured as provided in **Subsection 3.4**, are paid for at the contract unit price for the respective items, which price and payment is compensation for furnishing all material, labor, equipment, tools including hauling and placing all pipe sections and materials, excavation of the entire standard trench, bedding, and pipe structural backfill as described in the measurement section, removal of existing pipe to be replaced, constructing pipe joints, removal of old end treatments, cleaning out pipe, disposal of surplus materials, all visual inspection, and all incidentals necessary to complete the work.

The quantities for the items pipe culvert tees, wyes, elbows, bends, reducers, and increasers measured as provided in **Subsection 1.4**, are paid for as each.

The quantity of pipe additional foundation work, measured as provided for in **Subsection 3.4**, is paid for at the contract unit price, which price and payment is compensation for furnishing all material (foundation, extra bedding, extra structural backfill, extra geotextile, etc.), labor (additional trench excavation, compaction, etc.), equipment, tools, hauling, and disposal (of poor material) to complete construction of the pipe foundation, and wider trench as specified in the **SCDOT Standard Drawings**, the plans, or by the **RCE**.

Embankment material overfill in cut sections as described in the measurement section will be paid for as borrow.

All work associated with the excavation, removal and disposal of existing pipe culverts that will be replaced by a new structure will be paid for in the pay item of the new structure.

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

Pay items are listed in **Subsection 5**.

3.6 Referenced Documents (HDPE)

SCDOT Standard Specifications for Highway Construction

SCDOT Supplemental Technical Specifications:

SC-T-29

SCDOT Qualified Product Lists:

Qualified Product List 2

Qualified Product List 30

SCDOT Instructional Bulletins:

SCDOT Instructional Bulletin 2007-04

AASHTO Standard Specifications for Transportation Materials & Methods of Sampling and Testing:

AASHTO M 145

AASHTO M 294

ASTM Standard Specifications:

ASTM D 1149

ASTM D 2321

ASTM D 3212

ASTM F 477

4 Pipe Maintenance (All Existing Pipe)

This section contains specifications for the materials, construction, measurement, and payment of maintenance on existing pipe infrastructure. This work includes cleaning existing pipe to restore hydraulic performance to pipe being retained as well as removal or abandoning of pipe that will not be replaced by a new culvert.

4.1 Cleaning Out of Existing Pipe (All Existing Pipe)

Maintain retained pipe culverts that are clean in the same condition as they existed before beginning work. When specified in the plans, thoroughly clean out the entire length of existing pipe culverts. Remove all debris and settlement that affects the hydraulic performance of the entire pipe, including all debris within two pipe diameters of each end of the pipe.

4.1.1 Measurement of Existing Pipe Cleaning (All Existing Pipe)

The quantity for the cleaning of existing pipe culverts is measured in linear feet for the entire length of the pipe to be cleaned plus four pipe diameters.

4.1.2 Payment of Existing Pipe Cleaning (All Existing Pipe)

Cleaning of existing pipe, as measured in **Subsection 4.1.1**, is paid for at the contract unit price for Cleaning Existing Pipe, which price and payment is full compensation for all work and costs of cleaning, debris removal, transporting, disposing of all obstructions within the pipe that is to be cleaned and within two pipe diameters of each pipe end.

4.2 Removing of Existing Pipe (All Existing Pipe)

Remove existing pipe in accordance with the provisions of **SCDOT Standard Specifications Subsection 202.4.3**. Backfill and compact fill material to the same grade and slope of the area before the pipe was removed.

4.2.1 Measurement of Existing Pipe Removal (All Existing Pipe)

The quantity for the excavation necessary for the removal of existing pipe culverts that are not to be replaced by new culverts is measured in cubic yards as set forth in **SCDOT Standard Specifications Subsection 202.5**.

4.2.2 Payment of Existing Pipe Removal (All Existing Pipe)

The excavation for the removal of existing pipe as measured in **Subsection 4.2.1**, is paid for at the contract unit price for Unclassified Excavation as specified in **SCDOT Standard Specifications Subsection 202.6**, which price and payment is full compensation for all work and costs of removal, transporting, and storing or disposing of existing pipe that is not to be replaced by a new structure and re-installation and compaction of fill material to restore embankment to original grade.

4.3 Abandoning Pipe (All Existing Pipe)

At locations on the plans where existing pipe culvert is to be abandoned, plug the existing pipe using brick and mortar or use the Taylor Made Plastics, Inc. “Pipe Plug” or equal. Fill the entire abandoned pipe with CLSM that meets the strength requirements of the embankment and can be excavated. Place CLSM using a method that produces the smallest air pockets or voids within the abandoned pipe, such as pumping from a single location until the both ends of the pipe are full.

4.3.1 Measurement Pipe Abandoning (All Existing Pipe)

Measurement for pipe abandoning will be paid for as CLSM in accordance with **SCDOT Standard Specifications Subsection 210.5**.

4.3.2 Payment Pipe Abandoning (All Existing Pipe)

Payment for pipe abandoning will be in accordance with **SCDOT Standard Specifications Subsection 210.6**, which price and payment is full compensation for all work and costs of materials, labor, and construction costs to abandon the pipe. No additional pay items will be made for this work regardless of the method chosen.

5 Pay Items

Item No.	Item No.	Unit
714XXXX	<i>(size)</i> RC Pipe Culvert (RCP) - <i>(class)</i>	LF
714XXXX	<i>(size)</i> RC Pipe Culvert (RCP) - <i>(class)</i> AASHTO M315	LF
714XXXX	<i>(size)</i> Corr. Alum. Alloy Pipe Culvert (CAAP) - <i>(gage)</i>	LF
714XXXX	<i>(size)</i> Spiral Rib. Alum. Pipe Culvert (SRAP) - <i>(gage)</i>	LF
714XXXX	<i>(size)</i> Corr. Polyethylene Pipe Culvert (HDPE) – Type S	LF
714XXXX	<i>(size)</i> Smooth Wall Pipe Culvert	LF
714XXXX	<i>(size)</i> Corrugated Wall Pipe Culvert	LF

714XXXX	<i>(size) Pipe Additional Foundation Work</i>	LF
714XXXX	<i>(size) (kind) Pipe Culvert Beveled End Section (class or thickness)</i>	EA
714XXXX	<i>(size) (kind) Pipe Culvert Flared End Section (class or thickness)</i>	EA
714XXXX	<i>(size) (kind) Pipe Culvert Tee</i>	EA
714XXXX	<i>(size) (kind) Pipe Culvert Wye</i>	EA
714XXXX	<i>(size) (kind) Pipe Culvert (degree) Bend</i>	EA
714XXXX	<i>(size) (kind) Increaser (size) to (size) Diameter</i>	EA
7149999	Cleaning Existing Pipe	LF

SPECIAL PROVISION NO. 25
PIPE END TREATMENTS

DESCRIPTION:

For exposed pipe culvert ends, provide an end treatment in accordance with this special provision.

MATERIALS:

Rigid pipe culvert is Reinforced Concrete Pipe (RCP: 714-205-00). Flexible pipe culvert is either Spiral Ribbed Aluminum Pipe (SRAP: 714-610-00), High Density Polyethylene pipe (HDPE: 714-705-00), or Corrugated Aluminum Alloy Pipe (CAAP: 714-605-00).

Use minimum Class B riprap for pipe up to 84" diameter. Use minimum Class C riprap for pipe 84" diameter or larger.

Use minimum Class 4000 concrete (4000P for precast).

Use ASTM A-706 grade 60, low-alloy steel deformed rebar.

Use minimum AASHTO M-196 Alclad 3004-H32 alloy aluminum.

Use Type M Mortar Grout unless specified otherwise.

CONSTRUCTION REQUIREMENTS:

Use one of the following end treatments as specified in the plans or special provision:



For **ALL** exposed pipe ends, when an end treatment is not specified in the plans, use **Pipe Riprap Protection** (804-3xx-xx). For flexible pipe larger than 24" diameter, install pipe straight headwall, pipe end structure, flared end section, or wingwall section in addition to riprap.



Use **Pipe Beveled End** (719-610-00) when specified in the plans or special provisions. Beveled ends may only be used on flexible pipe up to 24" diameter and on rigid pipe up to 60" diameter. When beveled ends are specified on flexible pipe larger than 24" diameter, install pipe straight headwall, pipe end structure, flared end section, or wingwall section.



Use **Pipe Straight Headwall** (719-605-00) when specified in the plans or special provisions. Use straight headwall only in locations where pipe exposed end does not face the direction of traffic.



Use **Pipe End Structure** (719-615-00) when specified in the plans or special provisions. Use pipe end structure in locations where pipe exposed end faces the direction of traffic. Pipe end structures may be used in other locations if approved by the RCE.



Use **Pipe Flared End Section** when specified in the plans or special provisions.



Use **Pipe Wingwall Section** when specified in the plans or special provisions. Use pipe wingwall only in locations where pipe exposed end does not face the direction of traffic.

Completely seal interface between pipe and end treatment with grout. If bricks or shims are used to place pipe, take care to remove all air pockets and voids when grouting.

For systems not designed in the SCDOT Standard Drawings, provide shop drawings, installation procedure and design calculations for review by RCE. Design must include provision to control erosion around the structure and prevent the separation of the end treatment from the pipe system. Design must provide for a proper seal at all construction joints including the interface between the pipe and the structure. Design must be self supporting and not induce any additional loads on the pipe. Submit designs for

consideration as new standard drawings to the Design Standards Engineer at the address listed in the SCDOT Standard Drawings book.

MEASUREMENT:

Measure pipe in accordance with SC-M-714

End treatments for pipe will not be measured.

Replace SC-M-714 subsections x.4, paragraph 4 with:

Measure pipe culvert by the length of the centerline of each pipe run in linear feet (LF), complete and in place. For exposed ends, end treatments, beveled ends, flared ends, pipe end structures, and pipe wingwalls, measure the length to the outside exposed edge of the pipe (including entire length of beveled pipe section).

Add the following paragraphs to SC-M-714 subsections x.4:

Measure riprap in tons by the weight sufficient to protect end of pipe from erosion.

Measure geotextile for erosion control under riprap in square yards as required to separate the riprap from the embankment.

PAYMENT:

Replace SC-M-714 subsections x.5, paragraph 1 with:

Pipe beveled ends will be included in the unit cost of the pipe as specified in the plans. Pipe culvert and end treatments, measured as provided in **Subsection x.4**, are paid for at the contract unit price for the respective items, which price and payment is compensation for furnishing all material, labor, equipment, tools including hauling and placing all pipe sections and materials, excavation of the entire standard trench, bedding, and pipe backfill as described in the measurement section (both structural and embankment backfill in this region), removal of existing pipe to be replaced, constructing pipe joints, removal of old end treatments, cleaning out pipe, disposal of surplus materials, all visual inspection, and all incidentals necessary to complete the work.

Add the following paragraph to SC-M-714 subsections x.5:

Payment for riprap and geotextile for erosion control under riprap as measured in subsection x.4 includes all direct and indirect costs and expenses necessary to complete the work.

SPECIAL PROVISION NO. 26
SEEDING

Section 810.2.3.3 is hereby amended by adding the following note to the table:

- ² The use of Annual Sudan Grass for temporary vegetation shall be prohibited statewide.

SPECIAL PROVISION NO. 27
SEDIMENT & EROSION CONTROL SPECIFICATIONS DURING CONSTRUCTION

In order to meet the requirements of National Pollution Discharge Elimination System (NPDES) regulations, the Contractor shall take necessary measures to insure all sediment is maintained on-site during construction. Best Management Practices (BMPs) implemented by the Contractor shall include, but not be limited to, the following:

1. At stream crossings, silt fence shall be placed beginning at the structure (bridge, culvert, or pipe) along the construction line on the shoulder to a minimum distance of 200 linear feet from the crossing. This distance may be extended farther from the stream crossing if conditions warrant and if it appears that there is further potential for sediment to escape the site and damage the stream. Silt fence shall be placed along both the inside and outside shoulders of the roadway.
2. Additional silt fence shall be placed in areas outside of stream crossings if there appears to be any potential for sediment to escape the site and damage property.
3. At stream crossings, median catch basins shall be protected by the appropriate inlet filter to prevent the entry of sediment into the pipe system.
4. In locations away from stream crossings, additional catch basins shall be protected by the appropriate inlet filter if there appears to be any potential for sediment to escape the site and to be deposited in adjacent drainage systems and/or outfalls.
5. Any fill or cut slopes greater than five feet shall be stabilized with a temporary erosion control blanket.
6. The Contractor may select suitable accepted alternates for protecting catch basins in lieu of wrapping with silt fence. Hay bales are not considered a suitable alternate.

SPECIAL PROVISION NO. 28
EROSION CONTROL

Section 815 is amended as follows:

Page 953, **Subsection 815.6:**

After paragraph 15, add the following paragraph:

16 Payment for Removal of Silt Retained by Silt Fence is full compensation for removing and disposing of sediment deposits accumulated by silt fences as specified or directed and includes all 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.
Page 953, Subsection 815.6,

Change original paragraph number “16” to “17”.

SPECIAL PROVISION NO. 29 **EROSION CONTROL MEASURES**

In addition to the erosion control measures specified in the Plans, Standard Specifications, Supplemental Technical Specifications and the Special Provisions, the Contractor is advised that all land disturbing activities (clearing and grubbing, excavation, borrow and fill) are subject to the requirements set forth in the following permits and regulations:

- South Carolina Code of Regulations 63-380, Standard Plan for Erosion, Sediment, and Stormwater Runoff Control. The regulation may be viewed at the following Internet web address:

<http://www.scstatehouse.net/coderegs/c063.htm>

- Erosion and Sediment Reduction Act of 1983 (Title 48, Chapter 18 of the South Carolina Code of Laws of 1983, as amended). Section 70 of this code authorized the South Carolina Department of Health and Environmental Control (SCDHEC) to administer this regulation with respect to lands under the jurisdiction of the South Carolina Department of Transportation. The code may be viewed at the following Internet web address:

<http://www.scstatehouse.net/code/t48c018.htm>

- National Pollutant Discharge Elimination System (NPDES) General Permit Number SCR100000, effective September 1, 2006: The Environmental Protection Agency, in accordance with the Federal Clean Water Act, has granted to the South Carolina Department of Health and Environmental Control (SCDHEC) the authority to administer the Federal NPDES permit program in the State of South Carolina. The permit may be viewed at the following Internet web address:

<http://www.scdhec.net/environment/water/docs/finalcgp.pdf>

In accordance with the NPDES General Permit, sign a Co-Permittee Agreement and Contractor Certification statement (shown in Part 3.2D of the General Permit) and require all subcontractors performing land-disturbing activities to sign a Co-Permittee Agreement and Contractor Certification statement as part of their subcontract. These certifications are incorporated into the proposal form for the Contract. By signing either form, the Contractor acknowledges that upon award and execution of the Contract, he/she accepts/ understands the terms and conditions of the *Storm Water Pollution Prevention Plan (SWPPP)* as required by the NPDES General Permit and may be legally accountable to SCDHEC for compliance with the terms and conditions of the

SWPPP. In addition, the Contractor certifies that the NPDES certification statement and/or co-permittee status is made part of all its subcontracts.

The SCDOT will complete and forward a *Notice of Intent (NOI)* to SCDHEC. If SCDHEC does not send a letter within 10 business days of receipt of the *NOI*, authorizing coverage, denying coverage, or advising that a review of the *CECP* will take place, coverage will be automatically granted.

Prepare and submit a *Contractor's Erosion Control Plan (CECP)* to the RCE before the pre-construction conference. Ensure that the plan meets the requirements of the NPDES General Permit. The plan will be reviewed and approved by the Department before commencing any land disturbing activities.

At the pre-construction conference, with all contactors and subcontractors performing land-disturbing activities present, the *CECP* will be explained and discussed so that each contractor and subcontractor is made aware of their responsibilities in the *CECP*.

Once approved, fully implement the *CECP*. Coordinate the prompt installation of erosion control devices with construction activities to maintain compliance with the above regulations and NPDES General Permit.

Conduct an Erosion and Sediment Control Inspection by an appointed Certified Erosion Prevention and Sediment Control Inspector (CEPSCI) from the Contractor and the Department at least every 7-calendar days. Both parties will acknowledge participation in the inspection by signing the inspection report and include their inspector's CEPSCI number on the report. Correct deficiencies noted during these inspections within the assigned priority period. If deficiencies are not corrected within this timeframe, the RCE will stop all work (except erosion and sediment control measures) until the deficiencies are corrected.

Give special attention to critical areas within the project limits (i.e., running streams, water bodies, wetlands, etc.). In these areas, the RCE may direct the Contractor to undertake immediate corrective action, but in no case allow these deficiencies to remain unresolved more than 7 days or 48 hours in accordance with their assigned priority after being identified during the Erosion and Sediment Control Inspection.

Closely follow the grading operations with the seeding operations. Shape and prepare the slopes for seeding as the grading progresses. Unless the RCE grants prior written approval, limit the amount of surface area exposed by land disturbing activities to 750,000 square feet. Commence seeding operations within 7 days following completion of construction activities within an area.

Initiate stabilization measures within 7 days for an area where construction activities will be temporarily or permanently ceased for 21 days or longer.

Coordinate the installation of all other permanent erosion control items with the grading and seeding operations. These items include, but are not limited to, asphalt gutter and riprap. Construct gutter work before or promptly after the seeding is performed. Place riprap at the ends

of pipe immediately after the pipe is laid and promptly install riprap ditch checks after ditch work has been performed.

Failure to adequately comply with the provisions as detailed above or any other required erosion control measures will result in stoppage of all contract operations (except erosion and sediment control measures) until corrective action has been taken. Additional sanctions may be invoked by the SCDHEC in accordance with their authority.

Keep the following documents at the RCE's office from the start of construction until the site is finally stabilized:

- Copy of the *CECP*,
- Copies of all the co-permittee agreements and Contractor certification statements,
- Copy of the permit,
- Letter from DHEC authorizing permit coverage if provided by DHEC, and
- A marked-up set of site plans.

When uniform perennial vegetation achieves a cover density of 70%, submit a *Notice of Termination (NOT)* to SCDHEC to terminate coverage. Include a signed statement with the *NOT* certifying that all work on the site has been completed in accordance with the *SWPPP* and the NPDES General Permit for all sites one acre or greater.

Fines assessed on the Department by SCDHEC as the result of the Contractor's non-compliance or violation of said permit provisions will be paid by the Department and will subsequently be deducted from any monies due or that may become due to the Contractor. In case no monies are due or available, the fines incurred will be charged against the Contractor's Surety.

SPECIAL PROVISION NO. 30

ERRATA TO 2007 STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION

Make the changes listed below to correct errata in the SDCOT *2007 Standard Specifications for Highway Construction*:

DIVISION 100:

Division 100 is amended as follows:

Page 3, The table in **Subsection 101.2** is amended as follows:

SCDOT OFFICIALS AND OFFICES

DELETIONS		REPLACEMENTS	
BDE*	Bridge Design Engineer	PSE*	Preconstruction Support Engineer
BDG E*	Bridge Design Geotechnical Engineer	GDSE*	Geotechnical Design Support Engineer

*Wherever it appears in the text, replace the deleted abbreviation with the new abbreviation.

Page 18, **Subsection 102.8**, paragraph 2, item E, first sentence:
Delete the word "the" after the word "When".

Page 36, **Subsection 105.6**, paragraph 1, last sentence:
Change the word "THE" to "the".

DIVISION 400:

Division 400 is amended as follows:

Page 189, **Subsection 401.2.1.2**, paragraph 1, first sentence:
Delete the period at the end of the sentence and add "and **SC-M-406**".

Page 220, **Subsection 403.5**, first sentence:
Change "HMA Intermediate Course" to "HMA Surface Course".

Page 220, **Subsection 403.6**, first sentence:
Change "HMA Intermediate Course" to "HMA Surface Course".

DIVISION 600:

Division 600 is amended as follows:

Page 397, **Subsection 625.2.2.4.11**, paragraph 1, first sentence:
Change 6% to 0.06%.

Page 436, **Subsection 627.4.10**, paragraph 2, first sentence:
Change "period of 90 days" to "period of 180 days".

Page 436, **Subsection 627.4.10**, paragraph 2, second sentence:
Change "90-day observation period" to "180-day observation period".

Page 436, **Subsection 627.4.10**, paragraph 3, first sentence:
Change "90-day period" to "180-day period".

DIVISION 700:

Division 700 is amended as follows:

Page 650, **Subsection 709.6.3**:
Replace subsection number "709.6.3" with "709.6.4".

Page 693, **Subsection 712.4.4**, paragraph 2, last sentence in A.:
Change "*Drilled Shaft Report*" to "*Drilled Shaft Log*".

Page 702, **Subsection 712.4.10.4**, paragraph 1, last sentence:
Change "*Drilled Shaft Report*" to "*Drilled Shaft Log*".

Page 703, **Subsection 712.4.10.6**:

Change first paragraph reference number from “2” to “1”.

Page 713, **Subsection 712.6.10:**

Insert paragraph reference number “1” to the left of the first paragraph.

Page 772, **Subsection 723.1**

Insert paragraph reference number “3” to the left of the third paragraph.

Page 787, **Subsection 726.4.1**

Insert paragraph reference number “1” to the left of the first paragraph.

DIVISION 800:

Division 800 is amended as follows:

Page 910, **Subsection 815.1**, paragraph 1, first sentence:

Change “temporary flexible pipe” to “temporary pipe”.

Page 950, **Subsection 815.5**, paragraph 13:

Delete the first sentence and replace it with the following sentence;

The quantity for Temporary Pipe Slope Drains is measured and paid for in accordance with **Subsections 803.5** and **803.6** respectively.

Page 951, **Subsection 815.5:**

Delete paragraph 19.

INDEX:

The Index is amended as follows:

Page I-3, **Bridge Deck Rehabilitation, measurement and payment:**

Delete page 807.

Page I-12, **Letting:**

Replace page 19 with page 9.

Page I-13, **Overhead Sign Structure:**

Replace page 488 with page 495.

Page I-15, **Proof Rolling:**

Delete page 98.

Page I-18, **Structural Steel, turned and ribbed bolts:**

Replace page 624 with page 625.

INDEX:

Page I-19, **Waterproofing, bridge deck:**

Delete page 907.

Page I-20, **Working Drawings:**

Replace page 543 with page 779.

SPECIAL PROVISION NO. 31 **TRAFFIC SIGNAL INSTALLATION**

SC 61 (Ashley River Road) at RD 1373 (Tobias Gadson Blvd.)
County: Charleston File No. 10.037438A

PROJECT DESCRIPTION -

1.1 Scope. This Project involves the modification of an existing traffic signal at 1 intersections along SC 61/Ashley River Road in and around the city of Charleston, South Carolina. The intersections involved are shown on the attached "List of Project Signals". The Department will furnish the signal controller cabinets, and detector amplifiers. Otherwise, this is a "turn-key" project, with the contractor furnishing and installing all other equipment, as listed, complete and operational to the satisfaction of the Engineer.

GENERAL PROVISIONS -

2.1 All work under this Contract shall be performed under: the SOUTH CAROLINA DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION, "STANDARD SPECIFICATIONS FOR HIGHWAYS CONSTRUCTION", Latest Edition; these SPECIAL PROVISIONS; the "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" (latest revision); and the PLANS.

2.2 Section numbers appearing in these SPECIAL PROVISIONS refer to the section numbers in the STANDARD SPECIFICATIONS referenced above.

2.3 No existing signal plan was furnished to the engineer during the design phase of this signal modification. All locations of the existing signal loops, splice boxes, cabling, and conduits are approximate. The engineer does not warranty or guarantee the location and/or existence of the signal equipment shown on the plans. The contractor shall field verify the existence and locations of existing signal equipment which includes conduits, splice boxes, loops, controller, and signal poles. Any discrepancies in location of existing signal equipment shall be reported to the engineer.

CODES, LICENSES, & ABILITIES -

3.1 All work shall be done in a workmanlike manner to meet the highest industry standards, all in accordance with the requirements of the latest editions of the National Electrical Code (NEC), National Electrical Safety Code (NESC), the Illuminating Engineering Society (IES), American National Standards Institute (ANSI), National Electrical Manufacturer's Association (NEMA), and the regulations and standards of the local power company.

3.2 The following supplements Section 102.1. The contracting firm responsible for the performance of the work covered by these SPECIAL PROVISIONS, **must be licensed by the SC Licensing Board For Contractors, and possess a Journeyman Card issued**

by the South Carolina Municipal Association or as required by the city in which work occurs.

Further, at least one '**ON-SITE**' field supervisor shall have **LEVEL II** or higher, Traffic Signal Certification by the International Municipal Signal Association (IMSA). Photo copies of the license and certificate (for both above) shall be submitted at the PRE-CONSTRUCTION CONFERENCE, and must be approved by the Engineer before work is allowed to commence. The CONTRACTOR shall retain employee(s) holding the above certificate for the duration of the project; and the employee(s) shall be present **DAILY** and at the **FINAL INSPECTION**.

3.3 The CONTRACTOR shall employ persons capable of programming traffic signal controllers of the type used by this project. The CONTRACTOR shall possess both a desktop and a portable (laptop) computer, and be capable of using them to upload and download signal operating parameters.

SYSTEM INTEGRATION -

4.1 **THIS IS A "TURN-KEY" PROJECT**, WITH THE CONTRACTOR PERFORMING **-ALL-** ACTIVITIES, complete and to the satisfaction of the Engineer. The district will provide all timing parameters for the system.

QUANTITY LISTS -

Quantity Lists for "EQUIPMENT TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR" are available from Traffic Engineering at (803) 737-1050.

SUPPLEMENTAL SPECIFICATIONS -

6.1 The signal(s) shall be constructed in accordance with the detailed "**SUPPLEMENTAL SPECIFICATIONS FOR TRAFFIC CONTROL SIGNALS**"; and the plan details "**TRAFFIC SIGNAL STANDARDS**"; which by reference are made a part of these SPECIAL PROVISIONS. These documents may be obtained from the SCDOT, Director of Traffic Engineering, Traffic Signal & Systems Engineer, PO BOX 191, Columbia, SC 29202-0191.

SPECIAL INSTRUCTIONS TO CONTRACTOR -

7.1 This is a "TURN-KEY" project. The PLANS are schematic in nature, showing what is generally expected at each intersection. The CONTRACTOR must devise/refine the final details, working within the Supplemental Specifications, the Design Details, the Standards, and with the Engineer. Any deviation from the Plans must be approved by the Engineer.

7.2 At Project completion all traffic signals/equipment shall be complete and operational, to the satisfaction of the Engineer.

7.3 The CONTRACTOR shall furnish and install conduit, and splice (pull) boxes in the project, as shown on the Plans.

7.4 The equipment to be furnished by the Department includes controllers, cabinets and detector amplifiers.

NOTE: Contractor to install Department Furnished Equipment as directed by the appropriate 'Furnish and Install Specification'.

7.5 The CONTRACTOR SHALL FURNISH ALL OTHER MATERIALS such as signal heads, electrical wire and cable, span wires, signal lamps, sign brackets, loop detector sealant, conduit, miscellaneous fittings, electrical service parts, clamps, signs, ground rods, span wire fittings, staples, tape, and all other materials.

7.6 The Department shall furnish and the CONTRACTOR SHALL INSTALL 1 cabinets and 1 loop detector amplifiers.

The CONTRACTOR shall program each controller, to develop the phasing shown on the Plans, or the Phase Chart, or the Signal Sequence Diagram.

7.7 The CONTRACTOR will install the traffic signal to provide a completely modern installation. The CONTRACTOR shall install a new METERED ELECTRICAL SERVICE where shown on the plans. NOTE: the service may be either: Underground, - or- Overhead; depending on the latest requirements of the Power Company. Bids should be prepared accordingly. The CONTRACTOR shall furnish and install ALL NEW STEEL CABLE as directed on the plans and ALL NEW ELECTRICAL CABLE.

7.8 The CONTRACTOR shall furnish and install TRAFFIC SIGNAL HEADS, ELECTRICAL CABLE, AND CONDUIT as shown on the Plans. The CONTRACTOR shall install detector loops in the size, shape, and location shown on the Plans.

7.9 **In addition to the state requirements, all permits and licenses required by a City/County are the responsibility of the CONTRACTOR. The CONTRACTOR shall arrange with the utility company for hookup connections and attachment agreements.**

7.10 The CONTRACTOR shall adjust the existing down guy or aerial guy attachments to match with the new span attachment.

INSPECTION -

8.1 RCE. During construction, the INSPECTION will be the responsibility of the Department. The Department's Resident Construction Engineer (RCE), is the designated representative of the Engineer, for the purposes of this project.

8.2 Disputes. The CONTRACTOR is advised that in any dispute between the Contractor and the Manufacturer, concerning the operation/maintainability/reparability of any piece of equipment, THE DECISION OF THE ENGINEER SHALL BE FINAL.

8.3 **Faulty Equipment.** When equipment supplied by the Department is designated faulty by the RCE, if it is under warranty, the Contractor shall return it to the Manufacturer for replacement. The Manufacturer shall furnish a replacement unit.

MAINTENANCE OF TRAFFIC -

The CONTRACTOR shall maintain traffic throughout the length of this Project as required by the Standard Specifications. Additional traffic control shall be provided during traffic signal construction or lane closures, as directed by the Engineer.

CONTRACT SCHEDULE -

For the TRAFFIC SIGNAL CONSTRUCTION work, each Friday, for the week to come, the CONTRACTOR shall furnish the Resident Construction Engineer with a WEEKLY SCHEDULE, listing the location and date of each intended activity. This will permit scheduling signal inspection personnel. Deviation from this schedule may cause the Department to delay Inspection and Payments.

PAYMENT FOR MATERIALS ON HAND -

The attention of the CONTRACTOR is directed to Section 109.7 of the STANDARD SPECIFICATIONS; which is amended to include the following paragraphs.

When permitted by the Engineer, partial payment will be made for major traffic signal items that are being furnished by the CONTRACTOR. Certain items such as wooden poles, and other very heavy units not readily movable or vandalized, may be stored in unsecured locations either ON- or OFF-SITE. Other items such as signal heads, detector amplifiers, controllers, cabinets, and certain other major items may be stored in a secured/protected location either ON- or OFF-SITE. The equipment shall be labeled stating SCDOT, and the Project Name. Other requirements of Paragraph 109.8 remain applicable. Payment shall be in accordance with the following criteria:

1. For MATERIALS ON HAND, the Contractor may be paid at:
FIFTY (50%) PERCENT OF THE CONTRACT UNIT PRICE OF ITEM,
NOT TO EXCEED THE PAID INVOICE AMOUNT.
2. ONLY ITEMS MEASURED BY --EACH-- SHALL BE ELIGIBLE.
3. ONLY ITEMS WITH A UNIT PRICE EXCEEDING \$100
SHALL BE ELIGIBLE.
4. THE TOTAL INVOICE PRICE OF THE ITEMS SHALL EXCEED \$5000.

LIST OF PROJECT INTERSECTIONS TO BE UPGRADED TRAFFIC SIGNAL INSTALLATION

Intersection No.	Intersection Name	Comment*
1	SC 61(Ashley River Road) & RD 1373 (Tobias Gadson Blvd.)	SIGNAL MODIFICATION

[illegible]

***See Plans for installation and upgrade details – The information listed here is meant as special comments and not a complete inventory of the systems upgrade**

PROJECT SPECIFICATIONS

1. GENERAL -

1.1 Notifications -

1.1.1 Prior to beginning construction, the CONTRACTOR shall participate in a "Pre-Construction Conference" at a time and place to be scheduled by the Department's Resident Construction Engineer (RCE).

1.1.2 Any work performed without notification of the proper parties in the Department, will be treated as unauthorized work (see Section 105.11 of the Standard Specifications), and could result in nonpayment to the CONTRACTOR for that work.

1.2 Testing -

1.2.1 Inspection. This Project involves equipment previously purchased under a State annual contract, *plus* some additional equipment furnished by the CONTRACTOR. ALL MATERIALS shall be Inspected, Tested, and/or Checked for Certification, and shall be accepted by the Engineer, before being incorporated into the work. The CONTRACTOR is to assemble for system simulation testing: On-street Masters, Controllers, Cabinets, Modems, and Detector Amplifiers, at a site designated by the Engineer. Depending on circumstances, the site may be
** SCDOT, District 6 Electrical/Signal Shop **

1.2.2 Testing. Each Controller will be tested before installation on the street. The TEST will consist of complete system hookup, connection and operation of the Central Monitoring Computer, the On-street Masters, Modems, Internal Coordinators, and the Controllers, in a manner to simulate Closed Loop OPERATION. Cabinets shall be tested under electrical load. Tests will be performed by the CONTRACTOR, assisted and witnessed by the District Electrical Shop. It is the responsibility of the CONTRACTOR to arrange the TEST with the Shop, through the Engineer, and the Type 170 equipment manufacturers if needed. Proper operation of the System shall be demonstrated. The CONTRACTOR SHALL TEMPORARILY PROVIDE WIRE, CHEATER CORDS, INTERCONNECT CABLE, AND LAMP LOAD BANKS to conduct these simulation / validation tests.

1.2.3 Duration. During the TEST, the equipment must perform satisfactorily for a PERIOD OF SEVEN (7) DAYS for interconnected signals and THREE (3) DAYS for stand alone signals. If, during this time, any problem develops, it MUST BE RESOLVED, and a NEW seven/three day test period begun. At the conclusion of the test, the CONTRACTOR shall pick up the control equipment from the Shop. The delivery, testing, and pickup of the control equipment, is incidental to the equipment being furnished. NO separate payment shall be provided.

1.2.4 Compatibility. To insure compatibility, any additional equipment required during the life of this contract, as Change Order or Extra Work, shall be purchased by the CONTRACTOR from the same Manufacturer as the original item. These too shall be tested as above.

1.3 Documentation -

1.3.1 The CONTRACTOR shall submit for approval, catalog descriptions and documentation--THREE (3) COPIES--for each class of signal equipment and materials furnished by the CONTRACTOR. They are to be submitted to the Resident Construction Engineer FOR APPROVAL, PRIOR TO CONSTRUCTION.

1.3.2 At the time of such submission, the CONTRACTOR shall provide a copy of the Transmittal Letter, to the Engineer.

1.4 Power -

The CONTRACTOR, prior to beginning of any construction activity, shall coordinate as necessary with the Utility Company supplying the power for this project. A representative of the Utility Company should be present at the RCE's Pre-Construction Conference.

2. SUBMITTING AS-BUILT PLANS -

2.1 After the completion of the project, the CONTRACTOR shall furnish to the Engineer, three (3) "red-lined" sets of Plans showing the exact locations and sizes of all conduits, poles, pedestals, splice boxes, detectors, and the routing and destination of all wires leaving the control cabinets.

3. FINAL INSPECTION -

3.1 Request - The CONTRACTOR shall request Final Inspection one week prior to the desired day of inspection. Confirmation to the Resident Construction Engineer shall be provided forty-eight (48) hours prior to Final Inspection, that the project is on schedule and ready for inspection.

3.2 System Test - Upon completion of the Final Inspection and correction of any deficiencies, the work will be subject to a **sixty (60) day operational test** for the System, and for individual intersections. If during this period a problem arises in either the System or an individual traffic signal, it must be resolved, and a **NEW sixty (60) day test** period shall begin.

4. TRAFFIC CONTROL PLANS -

4.1 Typicals - Reference is made to "Standard Specifications", Section 104.7, Maintenance and Maintaining Of Traffic; and to Division 600, Traffic Control. It is the responsibility of the CONTRACTOR to prepare additional TCP's for situations not covered by the above. The CONTRACTOR shall submit the proposed replacement TCP's to the Engineer for approval, prior to implementation in the field.

4.2 Work Time - With the appropriate Traffic Control Plan and Traffic Control Devices in effect, the CONTRACTOR will be permitted to work between **SUNRISE and SUNSET**, subject to the following exception:

THERE SHALL BE **NO** LANE CLOSURES, NOR ANY WORK REDUCING TRAFFIC CAPACITY, PERMITTED ON THIS CONTRACT, BETWEEN THE HOURS OF 7 AM to 9 AM, and 4 PM to 6 PM ON ANY WEEK DAY unless permission is granted by the Engineer. **FULL TRAFFIC CAPACITY MUST BE RESTORED AT THE END OF EACH WORK DAY.**

4.3 Suspend Work - NO WORK WILL BE PERMITTED WITHIN A TRAFFIC LANE ON SATURDAYS or SUNDAYS, nor on STATE OR NATIONAL HOLIDAYS, nor on WORK DAYS PRECEDING SUCH HOLIDAYS, nor on THE FRIDAYS PRECEDING HOLIDAY WEEKENDS, without the written permission of the Engineer.

4.4 Maintenance Of Traffic - Work required for the Maintenance Of Traffic per the Traffic Control Plan shall be measured by LUMP SUM for the project, and be paid under the item established as TRAFFIC CONTROL--LUMP SUM. (This shall include any temporary construction signs.) Additional payment is provided for the permanent construction signs.

4.5 Pavement Marking - Because full traffic capacity must be restored at the end of each day, and because lane closures are temporary, the construction of traffic signals is in the nature of a "Maintenance Activity" as defined by SCMUTCD. Therefore Temporary and Permanent Pavement Markings will usually NOT be required for traffic signal work. If it is determined by the Engineer that the nature of the construction requires pavement marking, then the CONTRACTOR shall provide pavement marking to effectively control traffic in accordance with Section 602 & 604 as applicable.

4.6 Lane Closures - The CONTRACTOR shall request LANE CLOSURES twenty-four (24) hours in advance. Where required, the CONTRACTOR shall arrange for Police Traffic Direction twenty-four (24) hours in advance.

The CONTRACTOR shall furnish a FLASHING ARROW PANEL FOR EACH LANE CLOSURE, unless shown otherwise on the TCP's. Only ONE Flashing Arrow Panel shall be required. It will usually be located within the closed lane, according to the Traffic Control Plan Typical illustrations. Flashing Arrow Panels shall NOT be MEASURED, and are considered incidental to maintaining traffic.

4.7 Vehicles - EVERY VEHICLE used by the CONTRACTOR shall have ROTATING YELLOW WARNING LIGHTS (OR STROBE-LIGHTS) in addition to 4-way flashers, for use when operating in-or-near traffic.

4.8 Cones - All traffic CONES, used as channelization devices, shall be THIRTY-SIX (36") INCHES TALL. Cones shall have a reflective collar when used at night.

4.9 Flaggers - The CONTRACTOR shall furnish sufficient trained flaggers to implement the TCP's. Some TCP's may require four (4) or more flaggers. Only the STOP/SLOW PADDLE shall be used--red flags are not to be used.

MAINTENANCE OF OPERATION

Existing traffic signals shall **REMAIN IN OPERATION** until the new/modified installation has been satisfactorily tested, and it has been placed in operation after approval by the engineer. The Testing shall be accomplished without hazard to the traveling public and while the signal heads are suitably **BAGGED WITH BURLAP**. All signal heads in place, but not in use, shall be covered with **BURLAP**.

NOTE: PLASTIC BAGS ARE NOT ACCEPTABLE.

After approval is received from the Engineer, the new signal heads shall be switched into service during that controller phase being displayed by the existing equipment; and the existing equipment shall be turned off simultaneously. Immediately after the new signal equipment has been made operational, the existing signal heads shall be turned off, and removed.

The Contractor is cautioned to PLAN their work, to cause minimum interference with any existing signal operation. Adjustments in the existing equipment made necessary by the new installation, will be made at the expense of the Contractor.

The Contractor shall retain ownership of the materials and equipment after the intersection has been made operational, until Inspection and Acceptance (either partial or final) has been made by the Engineer. Prior to Acceptance, if the materials or equipment is damaged by whatever cause, the Contractor shall be responsible for repair or replacement.

The contractor shall be responsible for the maintenance and operation of all existing signals in the “LIST OF PROJECT TRAFFIC SIGNALS” from the date of the “NOTICE TO PROCEED” of the contract until the final acceptance of the project. This shall include all daily maintenance of signals and any emergencies which may arise. For emergency response times see “ADJUSTMENT OF SIGNAL EQUIPMENT” Specification. A maintenance response personnel list shall be submitted by the contractor at the pre-construction meeting and approved by the DEPARTMENT.

Unless otherwise provided, Maintenance of Operation of existing traffic signals will not be paid directly, but will be paid for under the item, Temporary Adjustment of Traffic Signal Equipment. This payment shall include and be full compensation for all labor, equipment, tools and incidentals necessary to complete the work.

TEMPORARY ADJUSTMENT OF TRAFFIC SIGNAL EQUIPMENT AND TIMINGS

DESCRIPTION - This work consists of the Temporary Adjustment of traffic control signal equipment, materials and timings, during the construction of this project. Highway construction often features new road alignment, a new cross section (widening), and a change in grade. Sometimes the maintenance of traffic requires the relocation of an intersection, or the installation of a temporary "construction" traffic signal. Relocation of signal equipment may also be required to avoid interference with heavy equipment. This item has been established to cover the equipment, materials, and labor that may be required to temporarily adjust the physical location of traffic signal features, such as poles, controller, steel cable, electrical cable, signal heads, etc. This item is also used to cover the installation and removal of a TEMPORARY CONSTRUCTION SIGNAL.

The intersections or locations for Temporary Adjustment are shown on the Plans, or stated in a "List Of Intersections". After all Temporary Adjustments have been made, and after the road construction has been completed, the final result shall be the traffic signals shown in the Plans.

The amount of work required by this item will vary greatly between projects. The Bidder/Contractor should carefully study the Road Plans, the staging of work, and the Signal Plans, to estimate the work required.

1. GENERAL -

1.1 Companion Specifications -

Several Specifications directly pertain to this subject: "REMOVAL, SALVAGE, AND DISPOSAL"; and "MAINTENANCE OF OPERATION"; and should be studied.

1.2 Continuity Of Signal Operation -

1.2.1 The Maintenance of Traffic (as provided in the Traffic Control Plan), and the SAFETY OF TRAFFIC is of prime importance. Safety will be enhanced by providing for the continuous operation of traffic signals. Signals shall NOT be arbitrarily turned off for the convenience of the CONTRACTOR. Instead, the adjusted, temporary signal shall be constructed, and the operation smoothly transferred to that signal. When the Engineer gives permission to briefly turn off a signal, complete intersection control using a flagger and/or Police traffic direction shall be provided.

1.2.2 Unless otherwise stated on the Plans, "fixed time" operation of actuated signals is permissible when the old loop detectors are abandoned. Likewise, it is permissible to adopt "uncoordinated" operation of adjacent signals, when the old interconnection cable has been broken. If possible, the District Traffic Engineer should be requested to provide temporary controller time settings for these conditions.

These temporary time settings may occur throughout the project life and therefore the contract will be paid for each site visit as necessary by bid item: **Temporary Timing Adjustment Per Site Visit**; and this work shall include all intersections needing timing adjustments per site visit. Site shall be defined as project limits.

1.2.3 At a CRITICAL INTERSECTION as designated by the Engineer or stated on the Plans, full Continuity of Operation shall be provided; and shall include the installation of a temporary Controller at the adjusted location, and transferring operation to it, simultaneously turning off the old controller.

1.2.4 If shown on the Plans, or stated in the Special Provisions, the CONTRACTOR shall provide SPECIAL DETECTION SYSTEMS to provide semi- or full-actuation of a Controller. If required, Special Detection may include Microwave, Infrared, sonic, or video camera detection. The equipment shall be NEW, and shall be installed and aimed per the manufacturer's specifications.

1.2.5 The appearance of temporary signals shall be fully professional. Signal heads shall be placed at the proper HEIGHT above the road, and at the correct ALINEMENT with lanes of traffic, and at the proper DISTANCE from the stop line (see MUTCD).

1.2.6 Temporary equipment shall be fully reliable, fully functional, and of good appearance.

1.3 Coordination Of Work -

The CONTRACTOR is advised to completely coordinate work between sub-contractors, and to carefully stage the project to minimize the work required by this item.

1.4 Final Configuration -

Signal equipment that has been relocated or adjusted shall be considered as "temporary". The CONTRACTOR shall plan and stage the work so that the end result is a traffic signal installation conforming to the plans and using all NEW equipment.

2. OPERATION, MAINTENANCE AND EMERGENCY SERVICE -

The contractor shall be responsible for the maintenance and operation of all existing signals in the "LIST OF PROJECT TRAFFIC SIGNALS" from the date of the "NOTICE TO PROCEED" of the contract until the final acceptance of the project. This shall include all daily maintenance of signals and any emergencies which may arise. The CONTRACTOR is also responsible of the liability for proper and safe operation of each signal. Herein, this activity will be termed "Maintenance".

2.1 Restriction -

The CONTRACTOR shall not change the phasing or other operation of a signalized intersection without Departmental approval.

2.2 New Signals -

Signals installed by the CONTRACTOR shall be Maintained by the CONTRACTOR until the Department formally accepts the work.

2.3 Requirements -

The CONTRACTOR shall perform EMERGENCY REPAIRS AND SERVICES as required, to insure continuity of operation of listed traffic signals and associated equipment. **This shall include replacement of burned out lamps.**

2.3.1 Technician. The CONTRACTOR shall provide at least one (1) qualified LOCAL signal technician, subject to call at all times, to provide emergency services as required to assure continuous and efficient operation of signal installations and systems. This shall include non-business hours, weekends, and holidays. The Technician shall be fully qualified to trouble-shoot, service, repair and/or replace traffic controllers and components, both electro-mechanical and solid-state. At the PRE-CONSTRUCTION CONFERENCE, the CONTRACTOR shall furnish the RCE with a LIST OF THE SIGNAL TECHNICIANS who will be responsible for performing the emergency service, and the LOCAL PHONE NUMBER(S) of the CONTRACTOR's agent(s) (answering service, etc.), who will receive emergency calls during and after the CONTRACTOR's normal business hours.

2.3.2 Repair Time. **The CONTRACTOR shall be ON-SITE of the malfunctioning signal for emergency service within the maximum time listed in the following schedule-**

<u>Weekdays or Saturday</u>	<u>Maximum Time</u>
6 AM to 6 PM	1 hour
6 PM to 6 AM	4 hours
<u>Sundays or Holidays</u>	
Day or Night	4 hours

2.3.3 Restoration of Normal Service. Once the CONTRACTOR has started repair work/emergency service, the CONTRACTOR shall restore a malfunctioning signal to normal phase operations uninterrupted.

2.3.4 Time Changes (EST/DST). As part of Maintenance, the CONTRACTOR shall reset all time clocks to local legal time.

2.3.5 Records. The CONTRACTOR shall maintain a LOG of all trouble calls received, the response time, and the corrective action taken. The records and logs shall be available to Department personnel for review during normal working hours. All records and logs shall be turned over to the Department at FINAL ACCEPTANCE.

2.4 Failure To Perform - In the event the CONTRACTOR fails to perform in accordance with requirements and schedules of this Specification, the Department reserves the right, without notice to the CONTRACTOR, to engage a Third Party to perform the maintenance

and emergency service necessary to assure continuous traffic signal operation. Further, all expenses incurred by the Department in implementing this option, shall be deducted from the payment due the CONTRACTOR, plus a FIVE HUNDRED (\$500) DOLLAR PENALTY FOR EACH OCCASION, FOR EACH DAY (UNTIL CORRECTED). The penalty shall be forfeited as liquidated damages.

3. SPECIFIC ITEMS -

3.1 Possession -

All TEMPORARY signal heads, signs, and poles shall revert to the CONTRACTOR at the end of the Project. All temporary NEW Controllers and Cabinets, and NEW Special Detectors shall revert to the Department or to the Jurisdiction at the end of the project.

3.2 Controllers and Cabinets -

For safety and reliability, ALL CONTROLLERS AND CABINETS, that are in continuous service for seven (7) or more days, SHALL BE NEW, AND SHALL BE COMPATIBLE WITH THE CONTROLLER TYPE (NEMA or 170) AND THE MANUFACTURED BRAND, USED BY THE JURISDICTION IN WHICH THE PROJECT OCCURS. The CONTRACTOR shall have in possession and shall furnish sufficient Controllers and Cabinets to provide Continuity Of Operation. The CONTRACTOR shall also provide, with each temporary Cabinet, sufficient Detector Amplifiers, Load Switch Packs, DC Isolators, relays, etc. to operate each intersection properly.

3.3 Signal Heads -

The CONTRACTOR shall provide sufficient 300 mm (12 inch) vehicle and pedestrian traffic signal heads to provide Continuity Of Operation. Signal heads shall be of the same configuration as that being replaced (e.g. 5-section). Signal heads shall be LED or fully lamped; 300 mm (12 inch) heads with 135 watt bulbs (or the Krypton filled watt-saver equivalent). Signal heads not in use shall be covered with a burlap bag. Signal heads shall be shifted side-to-side to be over traffic lanes as they are opened or closed to traffic.

3.4 Poles -

The location of temporary and final signal poles shall be approved by the Engineer.

3.5 Joint Use Poles -

Poles used for traffic signals, are often owned and used by other overhead cable utility companies. Full coordination and cooperation with those utilities shall be maintained when staging the signal work. The CONTRACTOR shall furnish the temporary and final wood poles as necessary for Continuity Of Operation. Back Guys shall be provided for wood poles, sufficient to keep the pole vertical.

3.6 Detector Loops -

Final Detector Loops shall only be installed after completion of all work activities which might damage the loops. Detector Loops may more conveniently be installed in the base

paving course, and covered with the final surface. It is preferred that loops be paved over rather than installed in saw cuts upon completion of paving.

3.7 Miscellaneous Equipment -

Minor equipment may be RE-USED in temporary adjusted configurations, but not in the final configuration. This includes steel cable, electrical cable, conduit, pedestrian buttons and signs, concrete pads, and spliceboxes/pullboxes/handboxes not utilized in the new signalization. The CONTRACTOR shall furnish sufficient steel cable and electrical cable to provide Continuity of Operation.

3.8 Signs -

Highway signs on existing steel cable (span wires), shall be transferred to the Adjusted spans, and placed in the same physical alignment. The Contract will usually specify new signs for the final configuration. (Ground mounted signs are covered in Section 107.11 of the STANDARD SPECIFICATIONS.)

3.9 Electric Service -

The CONTRACTOR shall install temporary electric service(s) as necessary to operate the signal(s). Coordination with the local power company and with the Engineer is the responsibility of the CONTRACTOR, as are all permits or licenses.

4. METHOD OF MEASUREMENT -

4.1 Basis -

The Temporary Adjustment of traffic signals will not be measured, but will be paid for on a LUMP SUM BASIS for the contract; for which the CONTRACTOR shall provide all signal materials and related equipment, and shall adjust these features as often as necessary during the course of the project, coordinating with other construction.

4.2 Estimate -

To prepare their cost estimate, the CONTRACTOR should develop an assessment of the work required over the life of the Contract, for EACH INTERSECTION shown on the "List of Intersections", or listed as a Temporary Construction Signal. The LUMP SUM is the total of these prices.

5. BASIS OF PAYMENT -

The Temporary Adjustment of traffic signals, measured as described above, shall be paid at the Contract price bid for--

TEMPORARY ADJUSTMENT OF TRAFFIC SIGNAL EQUIPMENT--LUMP SUM

Payment for Temporary Adjustment (T.A.) shall be made according to the same Schedule as shown in the Specification "Traffic Control Plan", namely:

% Contract Complete:	1-5%	6-15%	16-29%	30-49%	50-69%	70-89%	90-100%
% Payment for T.A.:	20%	40%	60%	70%	80%	90%	100%

The price and payment for adjusting traffic signal equipment shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals to perform the work as specified.

FURNISH AND INSTALL ELECTRICAL CONDUIT

DESCRIPTION - This work shall consist of furnishing and installing Electrical Conduit and fittings of the types and sizes specified herein, at locations shown on the Plans, or as established by the Engineer in accordance with these Specifications. All materials will be subject to inspection for condition by the Engineer, just prior to incorporation into the work.

1. MATERIALS -

Materials shall meet the requirements listed below:

1.1 Steel Conduit -

Steel electrical conduit shall be rigid, heavy-wall, galvanized steel, meeting the requirements of Federal Specification WW-C-581, and American Standards Association Specifications USAS C-80.1-1966.

1.2 PVC Conduit -

Plastic conduit shall be sunlight resistant Polyvinyl chloride (PVC), SCHEDULE 80, meeting the requirements of National Electrical Manufacturing Association (NEMA) Specification TC-2 and Underwriter Laboratory (UL) standards UL-514; and/or ASTM D-1784. Fittings shall meet NEMA TC-3 and UL-514.

1.2.1 HDPE Rolled Conduit – (High Density Polyethylene)

Underground cables can be installed in rolled conduit, directional bored (Trenchless) as an acceptable alternative. This conduit shall be a minimum of SCHEDULE 80. It shall be buried at a minimum of 18" depth.

1.3 Flexible Weather-Tight Steel Conduit -

Weather-Tight/liquid-tight flexible steel electrical conduit shall be single strip, helically wound, interlocking galvanized steel. It shall be made liquid-tight by an extruded polyvinyl chloride jacket; and shall meet the requirements of UL-360.

1.4 Fittings -

All Conduit Bodies, 90° Bends, Weatherheads, elbows, nipples, couplings, and other hardware shall be made of the same material and quality as the conduit run and shall be incidental to conduit installation.

1.5 The CONDUIT JUNCTION BOX (for some roadside detector loop installations), shall be a non-metallic PVC molded junction box with a weather tight screw-down cover, of nominal size 150 x 150 x 100D mm (6 x 6 x 4D inches). It shall be incidental to conduit

installation. Unless shown mounted on a pole, it shall be installed in the dirt, at the depth of the conduit run, and covered with earth.

1.6 Ground Bushings -

Grounding Bushings shall be threaded, made of malleable iron, galvanized steel, or brass; and shall have an insulating plastic insert, and lay-in lugs to hold No. 6 AWG copper wire.

1.7 Pulling Line -

The Pulling Line shall be Polypropylene Rope, having a minimum tensile strength of 1000 Newtons (240 pounds), which SHALL BE PULLED INTO ALL UNDERGROUND CONDUIT RUNS, AND SHALL REMAIN THEREIN FOR FUTURE USE.

1.8 Warning Tape -

Underground Warning Tape shall be Heavy duty B-720 polyethylene, 0.89 mm (3.5 mils) thick, by 76 mm (3 in) wide, with APWA color RED, for electric lines. The Tape shall be PLACED ABOVE ALL TRENCHED CONDUIT RUNS, just before the final back-fill.

1.9 Tracer Wire -

When conduit is used exclusively for Fiber Optic communication cable, a minimum 14 Ga. Tracer Wire shall be installed inside conduit.

1.10 Concrete -

Concrete used for patching pavement shall be DOT STANDARD SPECIFICATION CLASS X according to Sections 701,702,703, and 704.

1.11 Bituminous Asphalt -

Bituminous Asphalt for patching pavement shall be DOT STANDARD SPECIFICATIONS, Section 403.

2. CONSTRUCTION METHODS -

2.1 General -

Conduit shall be installed as either a Riser, or be Trenched, or Directional Bored.

2.2 Plans -

ALL CONDUIT SHALL BE INSTALLED AND PAID AS TRENCHED OR RISER UNLESS SPECIFICALLY SHOWN ON THE PLANS AS DIRECTION BORED.

2.3 Depth -

Unless shown otherwise, conduits shall be placed a minimum depth of eighteen (18) inches below surface grade, and shall slope at a minimum rate of 150 mm (6 in.), per 30 metres (100 ft.) of length, to a splice box/junction box hole or drain. All conduit runs shall be cleaned and swabbed before cables are installed. In poles, cabinets, and buildings, DUCT-SEAL shall be used to effectively seal the opening.

2.4 Direction -

Changes in direction of conduit shall be accomplished by the use of standard bends, elbows, or by bending the steel conduit. Steel conduit, if bent, shall have a uniform radius which will fit the location, with a minimum radius of six (6) times the internal diameter of the pipe. Sharp kinks in the conduit or the substitution of unlike materials will not be permitted.

2.5 Fittings -

Standard manufactured conduit bodies, condulets, Weatherheads, elbows, nipples, tees, reducers, bends, couplings, unions, etc., of the same materials and treatment as the straight conduit, shall be used as required throughout the conduit line. All fittings shall be tightly connected to the conduit. A SOLVENT-WELD CEMENT shall be used for fitting connections with PVC conduit. Where steel conduit mates PVC, an adapter coupling shall be used and sealed waterproof.

2.6 Cutting -

Nipples shall be used to eliminate cutting and threading where short lengths of conduit are required. Where it is necessary to cut and thread steel conduit, no exposed threads will be permitted. All conduit fittings shall be free from burrs and rough places; and all cut conduits shall be reamed before fittings and cables are installed. All conduit runs ending in a junction box, hand box, or other approved junction point, shall be provided with a bushing to protect the cable from abrasion. Conduit being placed for future use, shall be capped.

2.7 Location -

Where conduit passes under a curb, an 'X' shall be cut in the curb, over the conduit. Where there is no curb, a stake shall be driven in the ground at the end of the conduit to mark its location. Where conduit is placed in a signal pole foundation for future use, an 'X' shall be cut to indicate the side the conduit enters.

2.8 Risers -

Conduit Risers shall be attached to wood poles; or where specified, to the outside of steel poles. Stainless Steel bands shall be used for steel poles. Conduit clamps/straps and galvanized screws shall be used on wood poles. Attachment shall be in accordance with the Design Details, the Standards, or the Plans. Each Riser shall be furnished with a Weatherhead, which shall not be measured.

2.9 Trenching (Non-Paved Surface) -

Trenches shall be excavated to such depth as necessary to provide 18 inches minimum cover over the conduit. Cinders, broken concrete, or other hard abrasive materials will not be permitted in the back-filling. The trench shall be free of such materials before the conduit is placed. No conduit shall be placed prior to inspection by the Engineer. Back-Fill shall be compacted, and the surface restored.

2.10 Trenching (In Paved Surface) -

Trenches across driveways or streets shall be cleanly saw cut about 150 mm (6 inches) wide. The conduit shall be placed and the back-fill shall be compacted, and the patch shall be of like material and thickness as was removed. NO additional payment shall be made for the bituminous or concrete patching material, unless a pay item has been established for such.

2.11 Bored and Jack (Pushing) -

Where shown on the Plans as Bored Or Jacked, certain steel conduit to be placed under existing roadways, driveways, sidewalks, or other paved surfaces, shall be BORED AND JACKED. Such conduit shall be placed by jacking, boring, pushing, or other means approved by the Engineer, without cutting or removing pavement.

2.12 Trenchless (Directional Bored) -

When the signal design anticipates that HIGH-ACCURACY DIRECTIONAL BORING techniques will be used, and the conduit pulled back through the bore, then a pay item will be established for: **SCHEDULE 80 PVC CONDUIT (TRENCHLESS)**. The Directional Boring method shall be approved by the Engineer, and shall in no way crumple or damage the conduit. An acceptable alternative material can be **SCHEDULE 80 HDPE Rolled Conduit** – (High Density Polyethylene).

2.13 Placed Before Pouring -

Where shown on the Plans, PVC conduit, with Flexible Weather Tight conduit, shall be placed in roadways or structures, prior to pouring the concrete. Typical usage would be a bridge deck. The conduit shall be firmly attached to the bottom reinforcement bar mat, or to the bottom wire-mat, using plastic tie-wraps every 0.60 metre (2 feet). At expansion joints, 1.2 metre (4 foot) lengths (typical) of Flexible Weather Tight steel conduit shall be used to accommodate movement. These shall be installed to NEC standards for concrete structural installations and usage, including any recommended lubricants and sleeves. All conduit ends etc. shall be plugged to prevent concrete penetration. When used on a bridge, there will usually be splice-box(es) near the center line, and the conduit will terminate in hand-boxes at each end.

2.14 Restoration -

The Contractor shall restore all cuts, trenches, and openings to the original condition. Grass surfaces shall be replaced with pre-grown, cut turf (sod), in existing lawns. Other dirt areas shall be raked, seeded, and fertilized. While care should have been used to avoid them, any damaged trees and shrubs shall be replaced (if directed by the Engineer).

3. **METHOD OF MEASUREMENT -**

3.1 Electrical Conduit will be measured by the LINEAR FOOT (METRE), for the type, size, and method of installation specified, along the center line of the conduit from end to end, including trenched, risers, and bored-and-jacked.

3.2 Conduit Bends, Conduit Bodies, (condulets), 90° bends, elbows, conduit junction boxes for detector loops, miscellaneous fittings, couplings, WEATHERHEADS, adapters, bushings, locknuts, and other items shall be incidental to conduit installation and shall NOT be measured.

3.3 Unless otherwise specified, trenching, back-filling, and patching will NOT be measured for payment.

4. **BASIS OF PAYMENT -**

Accepted quantities of electrical conduit, measured as provided above, will be paid for at the Contract unit price bid for:

For conduit either Trenched or Riser:

___ IN.(MM) GALVANIZED RIGID CONDUIT -- LINEAR FOOT (METRE)
 ___ IN.(MM) PVC SCHEDULE 80 CONDUIT -- LINEAR FOOT (METRE)

For bored and jacked:

___ IN.(MM) GALVANIZED RIGID CONDUIT
 (BORED AND JACKED) -- LINEAR FOOT (METRE)

For high accuracy directional boring:

___ IN.(MM) PVC SCHEDULE 80 PVC CONDUIT
 (TRENCHLESS) -- LINEAR FOOT (METRE)

For flexibility:

___ IN.(MM) FLEXIBLE GALVANIZED STEEL CONDUIT
 - WEATHER-TIGHT -- LINEAR FOOT (METRE)

which shall be full compensation for furnishing and placing all materials, fittings, equipment, labor, and incidentals necessary to complete the work as specified.

FURNISH AND INSTALL ELECTRICAL CABLE

DESCRIPTION - This work shall consist of furnishing and installing traffic signal, loop lead-in, pedestrian signal, and pedestrian push button Electrical Cable of the size and type shown on the Plans, or as established by the Engineer, in accordance with these Specifications.

1. MATERIALS -

Materials shall meet the requirements listed below:

1.1 Traffic Signal Wiring -

1.1.1 **BLACK** - Unless specified elsewhere, the **traffic signal cable** shall be four pairs(8 conductor). The conductor shall be #14 AWG, 19 strands, bare copper. The conductor insulation shall be high density polyethylene and shall be both ultraviolet and weather resistant. The wall thickness shall be 0.016 inch minimum point thickness. A polyethylene filler material shall be utilized to produce a circular cross section with a polypropylene rip cord under the external jacket for easy removal. The conductor cable assembly shall be wrapped with a 0.001 inch clear mylar binder applied helically with a minimum 25% overlap. The overall cable assembly shall be provided with a high density polyethylene jacket which is both ultraviolet and weather resistant. The wall thickness shall be 0.032 inch minimum point thickness. Traffic signal cable shall be manufactured in accordance with the requirements of Underwriters' Laboratories, Federal specifications, and the National Electric Code.

1.1.2 Each cable run shall have the number of conductors indicated in the Standards, the Design Details, the Plans, or the WIRING DIAGRAM. These include the provision

of spare conductors. The substitution of additional cables to attain the required number of conductors shall not be permitted.

1.1.3 A separate cable shall be run for each phase or approach. (See TYPICAL WIRE & CABLE USAGE sheet.)

1.1.4 The list below is a guide to general usage--

Signal: Jumpers	4 pair (8 conductor)BLACK
Signal: To Each Approach	4 pair (8 conductor)BLACK

1.1.5 The traffic signal cable must also meet or exceed specifications in the chart below.

Conductor Insulation Pair Color	External Jacket	
	Insulation Color	Size,AWG
White-Yellow	Black	#14
Red-Green		
White w/Black Band-Yellow w/Black Band		
Red w/Black Band-Green w/Black Band		

1.2 Loop lead-in Wiring -

1.2.1 **GRAY** - Unless specified elsewhere, the **loop lead-in cable** shall be four pairs(8 conductor). Each pair shall be individually twisted (two turns per foot minimum). Outside diameter shall be 0.60 inch maximum. The conductor shall be #14 AWG, 19 strands, bare copper. The conductor insulation shall be high density polyethylene and shall be both ultraviolet and weather resistant. The wall thickness shall be 0.016 inch minimum point thickness. Each pair shall be wrapped with a 0.001 inch aluminum shield with a minimum 25% overlap. Aluminum is to be located on the outside. A polyethylene filler material shall be utilized to produce a circular cross section with a polypropylene rip cord under the external jacket for easy removal. The drain wire shall be #16 AWG, 19 strands, tinned copper. The conductor cable assembly shall be wrapped with a 0.001 inch clear mylar binder applied helically with a minimum 25% overlap. The overall cable assembly shall be provided with a high density polyethylene jacket which is both ultraviolet and weather resistant. The wall thickness shall be 0.032 inch minimum point thickness. Traffic signal cable shall be manufactured in accordance with the requirements of Underwriters' Laboratories, Federal specifications, and the National Electric Code.

1.2.2 Each cable run shall have the number of conductors indicated in the Standards, the Design Details, the Plans, or the WIRING DIAGRAM. These include the provision of spare conductors. The substitution of additional cables to attain the required number of conductors shall not be permitted.

1.2.3 A separate cable should be run to each corner of the intersection. (See TYPICAL WIRE & CABLE USAGE sheet.)

1.2.4 The list below is a guide to general usage--

Loop: To Each Corner

4 pair (8 conductor)GRAY

1.2.5 The twisted pair loop lead-in cable must also meet or exceed specifications in the chart below.

Conductor Insulation Pair Color	External Jacket Insulation Color	Size,AWG
White-Yellow Red-Green White w/Black Band-Yellow w/Black Band Red w/Black Band-Green w/Black Band	Gray	#14

1.3 Pedestrian Signal / Push Button Wiring -

1.3.1 **BLACK** - Unless specified elsewhere, the ***pedestrian signal cable*** shall be two pairs(4 conductor). The conductor shall be #14 AWG, 19 strands, bare copper. The conductor insulation shall be high density polyethylene and shall be both ultraviolet and weather resistant. The wall thickness shall be 0.016 inch minimum point thickness. A polyethylene filler material shall be utilized to produce a circular cross section with a polypropylene rip cord under the external jacket for easy removal. The conductor cable assembly shall be wrapped with a 0.001 inch clear mylar binder applied helically with a minimum 25% overlap. The overall cable assembly shall be provided with a high density polyethylene jacket which is both ultraviolet and weather resistant. The wall thickness shall be 0.032 inch minimum point thickness. Traffic signal cable shall be manufactured in accordance with the requirements of Underwriters' Laboratories, Federal specifications, and the National Electric Code.

1.3.2 **GRAY** - Unless specified elsewhere, the ***pedestrian push button cable and loop lead-in*** to each pole shall be two pairs(4 conductor). Outside diameter shall be 0.38 inch maximum. The conductor shall be #14 AWG, 19 strands, bare copper. The conductor insulation shall be high density polyethylene and shall be both ultraviolet and weather resistant. The wall thickness shall be 0.016 inch minimum point thickness. Each pair shall be wrapped with a 0.001 inch aluminum shield with a minimum 25% overlap. Aluminum is to be located on the outside. A polyethylene filler material shall be utilized to produce a circular cross section with a polypropylene rip cord under the external jacket for easy removal. The drain wire shall be #1 AWG, 19 strands, tinned copper. The conductor cable assembly shall be wrapped with a 0.001 inch clear mylar binder applied helically with a minimum 25% overlap. The overall cable assembly shall be provided with a high density polyethylene jacket which is both ultraviolet and weather resistant. The wall thickness shall be 0.032 inch minimum point thickness. Traffic signal cable shall be manufactured in accordance with the requirements of Underwriters' Laboratories, Federal specifications, and the National Electric Code.

1.3.3 Each cable run shall have the number of conductors indicated in the Standards, the Design Details, the Plans, or the WIRING DIAGRAM. These include the provision of spare conductors. The substitution of additional cables to attain the required number of conductors shall not be permitted.

1.3.4 A separate cable should be run for each phase or approach. (See TYPICAL WIRE & CABLE USAGE sheet.)

1.3.5 The list below is a guide to general usage--

Pedestrian Signal	2 pair (4 conductor)BLACK
Pedestrian Push Button	2 pair (4 conductor)GRAY
Loop Lead-in	2 pair (4 conductor)GRAY

1.3.6 The traffic signal cable must also meet or exceed specifications in the chart below.

Conductor Insulation Pair Color <u>Size,AWG</u>	External Jacket Insulation Color	
White-Yellow Red-Green	Black	#14
White-Yellow Red-Green	Gray	#14

1.4 Electrical Service Cable -
See FURNISH AND INSTALL ELECTRICAL SERVICE.

1.5 Loop Detector Wire -
See FURNISH AND INSTALL LOOP DETECTORS.

1.6 Communication Cable -
See FURNISH AND INSTALL COMMUNICATION CABLE.

2. CERTIFICATION -

2.1 The CONTRACTOR SHALL FURNISH design details in sufficient detail for complete evaluation of the Proposal and comparison with these Specifications. Any exceptions to these Specifications must be stated in writing.

NOTE: CATALOG CUTS ARE REQUIRED.

3. WARRANTY -

The Contractor shall furnish the Engineer with any warranties on materials that are provided by the Manufacturer or Vendor as normal trade practice.

4. LABELING AND DELIVERY -

4.1 The Manufacturer shall mark each cable and cable-reel to facilitate easy identification of the various sizes.

4.2 The cable shall be supplied in reels of sufficient length to assure splice-free installation.

5. CONSTRUCTION METHODS -

5.1 Field Wiring -

5.1.1 All cable runs shall be SPLICE-FREE. All connections shall be made at terminal blocks, or in the controller cabinet.

5.1.2 All field wiring shall be in accordance with applicable Electrical Codes-- National, State, and Local. Where required, arranging for PERMITS and/or electrical INSPECTION is the responsibility of the Contractor.

5.1.3 At each splicebox, strain pole base, and cabinet, at least One metre (3 ft.) of cable slack shall be provided. The slack shall be neatly coiled, and bound with a nylon tie.

5.1.4 At the cabinet end, each cable shall be labeled, using nylon cable markers, and indelible pen. The Phase and/or Approach (NB, EB, etc) shall be shown.

5.1.5 Cabinet connections shall correspond to the COLOR-CODE shown on the TYPICAL WIRE & CABLE USAGE sheet; (green wire to green signal circuit, etc). **NOTE: ALL WIRES SHALL BE TERMINATED IN EACH SIGNAL HEAD.**

5.1.6 The entire length of cables damaged during installation, shall be replaced, without further cost to the Department.

5.1.7 All electrical cable installed in conduit shall be drawn in place, free from electrical and mechanical injury. When a lubricating agent is needed, a wire pulling compound compatible with the cable insulation shall be used.

5.1.8 Vertical cable runs mounted on the outside of poles shall be installed in conduit of the type shown on the Design Details or in the Standards.

5.1.9 Weather service heads shall be used wherever electrical cable directly enters a strain pole or a vertical conduit run.

5.1.10 Drip loops of at least 20 cm (8 in.) shall be provided at all overhead entrance points such as signal heads, strain poles, or weather heads.

5.2 Conduit -

All conduit and elbows shall be installed as described in the appropriate Specification (e.g. FURNISH AND INSTALL ELECTRICAL CONDUIT; FURNISH AND INSTALL LOCAL CONTROLLERS AND CABINETS; FURNISH AND INSTALL STRAIN POLES; etc.)

6. METHOD OF MEASUREMENT -

With the exception of the electrical service cable, electrical cable lengths of the size and numbers of conductors specified, shall be measured by the LINEAR FOOT (METRE) as actually furnished and installed, completely in place and accepted, with each size cable being a separate pay item.

7. BASIS OF PAYMENT -

These items, measured as provided above, will be paid for at the Contract unit price bid for:

NO. 14 AWG COPPER WIRE ____ CONDUCTOR, (COLOR) --LIN. FT.

which shall be full compensation for furnishing all material, labor, equipment, and incidentals necessary for furnishing and installing cable as specified.

FURNISH AND INSTALL COMMUNICATION CABLE

DESCRIPTION - This item shall consist of furnishing and installing voice-grade, twisted-pair, telephone-type Communication Cable of the size and type as shown on the Plans or as directed by the Engineer, in underground conduit, conduit risers, and/or overhead, complete with all necessary hardware as required.

1. MATERIALS AND EQUIPMENT -

1.1 General -

The cable and installation shall comply with applicable National specifications, such as the National Electrical Code (NEC); also, the International Municipal Signal Association (IMSA) standards.

1.2 Self-Supporting Voice-Grade Communication Cable - OVERHEAD

SHALL BE IMSA STANDARD 40-4.

Electrical cable supplied under this Specification shall be figure-eight, self-supporting cable that shall include a 6 mm (1/4 in.) diameter, galvanized-stranded-messenger cable with a minimum tensile strength of 28912 Newtons (6,500 pounds) that is integrated into the outer cable jacket. The messenger cable shall support a polyethylene-jacketed, copper-shielded, voice grade cable rated at 300 volts, containing ** twisted-pairs of No. 19 AWG, solid copper conductors which are insulated with polyethylene and are color coded.

1.3 UNDERGROUND Voice-Grade Communication Cable -
SHALL BE IMSA STANDARD 40-6.

Electrical cable supplied under this Specification shall be polyethylene jacketed, copper-shielded, voice grade cable rated at 300 volts, containing ** twisted-pairs of No. 19 AWG solid copper conductors which are insulated with polyethylene and are color coded.

** The NUMBER OF TWISTED PAIRS shall be as specified on the Plans or the Bid.

1.4 Usage -

The cables specified above may be used with either low voltage telephone level signals, or may be used with 115 VAC interconnection circuits used with pre-timed controllers.

1.5 Supporting Hardware -

For overhead installation standard telecommunications industry, non-corroding hardware shall be used to attach the cable to utility or other poles. Cable suspension clamps shall be designed for "Figure Eight" cable, shall have a "J-hook" for installation convenience, and shall include a thru-bolt of the size and length required by the utility company. The suspension clamp shall be appropriate to the "turning angle" of the cable at that point of the installation, including the use of corner suspension clamps where necessary. Deadends shall be used as necessary.

1.6 Electrical Conduit -

Where required, all conduit and fittings supplied shall be in accordance with the Specification, FURNISH AND INSTALL ELECTRICAL CONDUIT.

2. CERTIFICATION -

2.1 The CONTRACTOR SHALL PROVIDE certified TEST RESULTS from the Manufacturer, showing that the cable to be furnished has passed all IMSA specified tests. The Manufacturer shall agree to provide the Engineer free-access to the factory to observe the manufacturing process.

2.2 The CONTRACTOR SHALL FURNISH design details and shop drawings in sufficient detail for complete evaluation of the cable and comparison with these Specifications. Any exceptions to these Specifications must be stated in writing.

NOTE: CATALOG CUTS ARE REQUIRED

3. WARRANTY -

The CONTRACTOR shall furnish the Engineer with any warranties on equipment and material that are provided by the Manufacturer or Vendor, as normal trade practice.

4. LABELING AND DELIVERY -

4.1 Unless otherwise stated, the cable shall be supplied in minimum reels of 750 metres (2,500 ft.), for splice-free installation.

4.2 The Manufacturer shall be required to mark each cable and cable reel to facilitate easy identification of the various sizes when stored in stockpiles.

5. CONSTRUCTION METHODS -

5.1 Communication cable shall be installed where, and in the manner indicated on the Plans, or as directed by the Engineer. The attached color code shall be followed.

5.2 Underground -

When installed underground, all communication cable will be installed in conduit, of the size and type shown on the Plans.

5.2.1 Ducts. When cable is pulled through Ducts or Manholes, the installation shall be performed ACCORDING TO UTILITY COMPANY SPECIFICATIONS, IN DESIGNATED DUCTS, WITH A UTILITY COMPANY INSPECTOR STANDING BY. Lateral runs shall be made to Controller or Splice Cabinets. No splices shall be made in a Utility Company manhole.

5.2.2 Existing conduits or ducts shall be reamed prior to use.

5.2.3 In manholes, cable shall be wrapped with plastic tracer tape, and shall also be tagged with indelible label similar to "LOW VOLTAGE TRAFFIC SIGNAL CABLE".

5.2.4 At completion, Ducts shall be sealed/plugged per Utility Company requirements.

5.3 Overhead -

When overhead installation is shown on the Plans, self-supporting cable shall be used according to the following--

5.3.1 Where shown on the Plans, overhead communications cable shall be installed on wood poles. Cables shall be attached to utility poles by means of standard hardware as shown on the Plans and IN ACCORDANCE WITH THE REQUIREMENTS OF THE OWNER (UTILITY COMPANY).

5.3.2 Unless stated by the Utility Company, attachments to utility poles shall be made a minimum of 3 metres (10 ft.) below primary electrical cables or other facilities carrying 750 volts or more. A minimum vertical clearance of 5.5 metres (18 feet) above Interstate and arterial highways shall be maintained.

5.3.3 Vertical cable runs mounted on the outside of poles shall be installed in proper conduit risers (see FURNISH AND INSTALL ELECTRIC CONDUIT).

5.3.4 Where shown on the Plans, communications cable may be installed overhead between an splice cabinet and a controller cabinet, via existing strain poles and signal span wire. The locations involved are shown on the Plans. Cable Supports attached to the span wire, shall be used.

5.4 Splices -

CABLE RUNS SHALL BE SPLICE-FREE. Splices shall only be allowed ABOVE GROUND, in either CONTROLLER CABINETS, or SPLICE-CABINETS, or SAMPLING STATIONS, or AERIAL TERMINAL BOXES as shown on the plans.

5.5 Connections -

5.5.1 In controller-, splice-, and sampling station-cabinets, and aerial terminal boxes, the cables shall be connected to firmly mounted terminal blocks. Terminal Blocks shall be telephone quality, R66 "Quick-Connect M-type", having ** pairs capability, and use a "Stand-Off Mounting".

5.5.2 Connection shall also be made to cables/harnesses required by the Remote Communication Unit (RCU), or sampling station detectors, per Manufacturers instructions.

5.5.3 Grounding and/or lightning protection shall be installed, in accordance with the requirements of the controller or modem Manufacturer, and shall be incidental to this item.
If directed by the Manufacturer, the UN-USED PAIRS of the communication cable shall be connected to ground at one or more point(s).
At each cabinet, communication cable shielding shall be grounded to the earth ground system.

5.5.4 Testing. The CONTRACTOR IS COMPLETELY RESPONSIBLE FOR TESTING THE COMMUNICATION CABLE SYSTEM. Following complete installation and connection of the communication cable, it shall be tested BY THE CONTRACTOR; from INTERSECTION TO INTERSECTION, and THE ENTIRE LENGTH from the FIRST TO LAST INTERSECTION. Surge protection shall be disconnected during some tests, and then reconnected. During some tests, the communication lines shall be disconnected from the 170 controller. Tests performed by the CONTRACTOR shall include:

A. A high-impedance FET voltmeter shall be connected to each pair, to determine if stray DC/AC voltages are present.

B. An insulation resistance test shall be performed, using a portable hand-held "Megger". Tests shall be performed between pairs, and to ground. The resistance shall be greater than 10 meg-ohm at 500 V.

C. An attenuation test shall be performed. The technician shall "Ring-Out" each twisted pair for continuity test, recording the round trip loop resistance, which shall be less than 60.6 ohm per kilometre (18.5 ohms per 1000 feet).

D. A sound powered telephone shall be connected to each pair, one by one. The quality of transmission shall be recorded on a scale of 1 to 5 (five being the best).

E. If necessary, the CONTRACTOR shall be prepared to fully trouble-shoot the cable system in the event of problems, using a computer type DIGITAL TEST INSTRUMENT, and/or an oscilloscope.

5.5.5 Test . Tests shall be witnessed by the Engineer.

6. INCIDENTALS -

6.1 Weather (Service) heads shall be used wherever the cable directly enters a strain pole or a vertical conduit riser run.

6.2 Drip Loops of at least 20 cm (8 inches) shall be provided at all overhead entrance points such as strain poles and vertical conduits.

6.3 Slack shall be provided at pull boxes, splice boxes, interconnect cabinets, controller cabinets and other junction points. One metre (3 ft.) of cable slack shall be provided, neatly coiled, tied-off, and positioned in the bottom of the enclosure.

6.4 All electrical cable pulled in conduit shall be drawn in place, free from electrical or mechanical injury. When a lubricating agent is needed, a wire-pulling compound compatible with the cable insulation shall be used.

7. METHOD OF MEASUREMENT -

7.1 Communications cable, of the type and size specified, will be measured by the LINEAR FOOT (METRE) of cable actually furnished and installed, completely in place and accepted. Each cable size shall constitute a separate pay item, where indicated.

7.2 Aerial Terminal Boxes shall be NOT be measured, but are required, and shall be considered incidental to overhead cable installation.

7.3 NOTE: Electrical conduit, pull boxes, splice cabinets, and steel span wire are listed elsewhere as separate pay items.

8. BASIS OF PAYMENT -

8.1 Communications cable measured as provided above and accepted will be paid for at the unit price bid per linear foot (metre) for:

ELECTRICAL COMMUNICATION CABLE -
(OVERHEAD/UNDERGROUND)
** -PAIR -- LINEAR FT. (METRE)

8.2 Aerial Terminal Boxes shall NOT be paid, but shall be considered incidental to the installation of Overhead Communications cable.

Such payment shall be full compensation for furnishing all material, labor, hardware, equipment and incidentals necessary for furnishing and installing communications cable and completing the work as specified.

FURNISH AND INSTALL DETECTOR LOOPS

DESCRIPTION - This work consists of furnishing and installing Detector Loops within and alongside the roadway, at the locations shown on the Plans, and in accordance with these Specifications. A Detector Loop installation shall consist of: installing the required conduit runs; making the pavement saw cut; placing the required number of turns of loop wire in the saw cut; creating a twisted pigtail; splicing the pigtail to the shielded, twisted pair lead-in cable; connecting the lead-in cable to the back-panel terminals at the controller cabinet; verifying proper detection of traffic; and sealing the saw cut. Several items used to create a complete detector installation are specified elsewhere. They are: FURNISH AND INSTALL ELECTRICAL CONDUIT; and FURNISH AND INSTALL SPLICE BOXES/ JUNCTION BOXES. The "junction point" referred to in the specifications below, is defined to be a splice box, or a conduit junction box as specified on the Plans.

1. MATERIALS -

Materials used in the fabrication of a Detector Loop shall meet the Specifications below:

1.1 Loop Wire -

Shall be splice-free lengths of: No. 14 AWG, 19 Strands, single-conductor bare copper wire. The conductor insulation (**BLACK**) shall be high density polyethylene and shall be both ultraviolet and weather resistant. The wall thickness shall be 0.030 in. minimum point thickness. Cable shall be manufactured in accordance with the requirements of Underwriter's Laboratories, Federal specifications, and the National Electric Code.

1.2 Lead-in Cable -

SEE 'FURNISH AND INSTALL ELECTRICAL CABLE'

1.3 Sealant -

The loop sealant used to fill the saw cuts and other gaps, shall be of a type intended for traffic loop embedding. The cured sealant shall be semi-flexible, and be capable of adhering securely to concrete, asphalt, wood, metal, etc. It shall be unaffected by freeze-thaw cycling, salts, gasoline, oil, sewerage and corrosive chemicals. It shall be proportioned and mixed per the manufacturer's specifications. Acceptable suppliers are:

3-M Detector Loop Sealant;
 Preco Gold-Label Flex;

CraftCo MSI Hot Flow;
 Bondo P-6061;
 Pro-Seal 6006 or Pro-Seal 6006EX;
 (--OR APPROVED EQUAL--)

1.4 Waterproofing Splice Materials -

The splice at the "junction point", shall be made waterproof using the materials listed below:

1.4.1 Cable Splice Kit -

Commercially available, Low-Voltage, water-proof Splice-kit; to be Plymouth "PLYFLEX"; or 3M "SCOTCH-LOK", Unipak #3570, Resin 400, (or approved equal). To be installed per manufacturers instructions.

1.4.2 Vinyl plastic electrical tape (use where required)- Cold and weather resistant, 19 mm (3/4 inch) wide, 1.8 mm (7 mil) thickness, (Scotch 33+ or approved equal).

1.4.3 Liquid electrical coating (use where required)-

Fast-drying sealant compatible with vinyl tape, brush-applied (3M, Scotchkote or approved equal).

1.4.4 Underwater Splicing Kit -

Where shown on the Plans, in very wet areas an Underwater Splice Kit may be required at the "junction point". This splicing kit shall consist of a two-piece mold-body, with pourable resin sealing compound, funnels, and end sealing strips (3M, Scotchcast 82-A1 or approved equal).

1.5 Wire Crimps -

The PREFERRED splicing method at the "junction point", shall use a commercial/industrial grade, copper-alloy CRIMP-ON, with one end closed, of a size proper for the gauge of wires to be spliced, and the number of conductors. It shall be installed with the proper CALIBRATED, RATCHET-TYPE, CRIMPING TOOL, intended for the purpose (NOT regular pliers). (Note: wire-nuts are not acceptable.)

1.6 Solder -

The alternate method of splicing at the "junction point" is to use SOLDER, which shall be electronic-grade, rosin-core, 60 lead/40 tin. Acid-core solder is not acceptable, nor are acid-type soldering pastes.

1.7 Splice Box and Junction Box -

Specified elsewhere as separate items. The references to "junction point" in this specification will usually imply such a splice box, or conduit junction box. However, some Plans may require direct installation to a signal pole base, where the splice between the loop wire and the lead-in cable will be made in the hollow pole.

1.8 Electrical Conduit -

Specified elsewhere as a separate item.

2. **CERTIFICATION** -

2.1 The CONTRACTOR SHALL PROVIDE details for the proposed loop sealant, loop wire, and lead-in wire.

NOTE: CATALOG CUTS ARE REQUIRED.

SAMPLE REQUIRED.

3. **CONSTRUCTION METHODS** -

3.1 Saw Cuts -

3.1.1 The LOCATION and SIZE of each loop shall conform to the Plans and to the Standards. In general, the front of each loop shall be located 0.3 to 0.45 metres (12 to 18 inches) behind the Stop Line, or as shown on the Plans.

3.1.2 Loops shall be centered in the traffic lane to be detected or as shown on the Plans.

3.1.3 Prior to cutting, the intended saw cut shall be carefully (using paint or chalk) marked on the pavement and approved by the Engineer.

3.1.4 The Contractor shall slot the roadway using a diamond or abrasive rotary power-saw with a blade approximately 9.5 MM (3/8 INCH) IN WIDTH. The saw shall a power-driven walk-along model, not a hand-tool.

3.1.5 The MINIMUM DEPTH of each Saw cut shall be:
50 MM (2 INCHES) DEEP in CONCRETE; and
65 MM (2-1/2 INCHES) DEEP in BITUMINOUS pavement.

3.1.6 The corner treatment of the saw cut shall prevent sharp edges. Saw cuts shall be extended to provide full-depth. All corners, where loop wires turn, shall be diagonal cut.

3.1.7 Saw cuts shall be washed out, blown dry, and shall be free from dust, grit, oil and moisture before the placement of wire. Compressed air shall be used to blow dry.

3.1.8 Saw cutting of curb and gutter shall not be permitted. Rather, a 38 mm (1-1/2 inch) hole shall be drilled under the curb at a 45 angle.

3.1.9 Pavement seams or cracks should be avoided. However, when it is necessary to traverse a crack, a 50 mm (2 inch) diameter hole at least 76 mm (3 inches) deep should be drilled, and slack provided in the loop wire to allow for expansion and contraction.

3.1.10 Loop installation shall be staged so that each entire loop installation (from saw cut to sealing) is completed within the same working day with minimum blockage of traffic.

3.2 Loop Wire -

3.2.1 Each loop wire shall be continuous and splice-free. Further, any wire with cuts, breaks, or nicks in the insulation shall not be accepted. All loops shall be wired in one direction, this will be a counter-clock-wise direction.

3.2.2 Each loop shall have the number of Turns shown in the table below, or as shown on the Plans.

<u>SIZE</u>	<u>NUMBER OF TURNS</u>
1.8 x 1.8 m (6 x 6 ft)	4
1.8 x 3.0 m (6 x 10 ft)	4
1.8 x 4.6 m (6 x 15 ft)	3
1.8 x 6.0 m (6 x 20 ft)	3
1.8 x 9.2 m (6 x 30 ft)	3
1.8 x 12.2 m (6 x 40 ft)	2
1.8 x 15.2 m (6 x 50 ft)	2
3.0 x 6.0 m (10 x 20 ft)	3
3.0 x 9.2 m (10 x 30 ft)	3
3.0 x 12.2 m (10 x 40 ft)	2
OTHER SIZE'S	AS PER PLANS

3.2.3 Each Detector Loop shall be formed by installing in a separate saw cut, one (1) continuous length of single conductor wire, from the nearest approved "junction point", around the loop the specified number of turns, then back to the "junction point".

3.2.4 The "pigtail" from the corner of the loop, formed by the two ends of the loop wire, shall be twisted together with a pitch of 15 TURNS PER METRE (YARD), between the "junction point" and the loop itself.

3.2.5 The wire shall be pressed to the bottom of the saw cut slot. A roller or a blunt-stick (similar to a paint stirrer), shall be used to seat the loop wire at the bottom of the slot or channel. In no case shall a screw driver or similar sharp tool be used for this purpose.

3.2.6 The wire shall be laid in the slot so that there are no kinks or curls, and no straining or stretching of the insulation around the corner of the slot, or at the junction.

3.2.7 After placing the wire in the slot, it shall be rechecked for slack, raised portions, and tightness.

3.2.8 2.5 CM (1 INCH) LENGTHS of 13 mm (1/2 inch) closed-cell foam-plastic (BACKER-ROD) shall be used at 0.6 metre (2 foot) spacings, to hold the wire at the bottom of the slot.

DO NOT use backer-rod around the entire perimeter!

3.2.9 The loop wire pigtail should be enclosed in conduit from the roadway edge to the "junction point".

3.2.10 Each loop shall be TESTED BEFORE SEALING. the inductance shall be in the range of 50 to 2500 micro-Henrys. The insulation resistance measured to earth ground shall be greater than 100 megohms at 500 volts DC.

Note: MEGGER TEST and INDUCTANCE TEST REQUIRED before and after sealing. A written record of the test shall be submitted to the Engineer on an approved form.

3.3 Lead-In Cable -

3.3.1 The lead-in cable shall be continuous, splice-free, and free from cuts or nicks in the insulation.

3.3.2 At the specified "junction point", the twisted "pigtail" from the loop wire shall be spliced to the shielded, (twisted-pair) lead-in cable that runs from the "junction point" to the controller cabinet (terminal).

3.3.3 The "junction point" splice shall be electrically permanent and sealed waterproof. Forty (40) mm (1-1/2 inches) of insulation shall be removed from each wire. The splice shall be either crimped-on, -or- twisted and soldered. the entire splice shall then be sealed waterproof using a method described below. The Engineer must be present to witness these acts. Any splices made without the presence of the Engineer are unacceptable, and shall be re-spliced. The methods of waterproof sealing are:

A. Normal Splice -

Each individual splice (pair of twisted loop wires meeting pair of loop lead-in wires), shall be performed by using either crimp-on's, or a soldered joint. The junctions shall then be sealed in a low-voltage, waterproof splice kit. The splice kit shall be installed per the manufacturers instructions.

B. Underwater Splice -

Where required on the Plans an underwater splice kit shall be installed according to the manufacturers instructions.

3.3.4 Sufficient slack shall be left in both the lead-in cable and the loop wire, so that the splice may be moved 1.0 metre (3 feet) from the front of the "junction point". The slack shall be neatly coiled and nylon-tied after completion of the splice.

3.3.5 In the controller cabinet, the lead-in cable shall be uniquely identified by an insulated, preprinted-sleeve, slipped over the wire before attachment of a spade-lug connector. A spade-lug connector shall be crimped onto each loop lead-in wire.

3.3.6 In the controller cabinet, the ground (drain) wire from each lead-in cable shall not be connected. Rather it shall be cut-off at the cable sheath, and left floating.

3.3.7 Unless otherwise specified, the lead-in cable shall be enclosed in conduit from the "junction point" to the nearest signal pole, or directly to the controller if it is on the same corner. The cable shall then run: up inside a conduit or metal pole, across span wires, and then down inside a conduit or metal pole, to the controller.

3.4 Sealant -

3.4.1 The Department approved Loop Sealant shall be mixed and applied according to the manufacturer's directions.

3.4.2 The sealant shall not be poured into saw cuts during weather conditions of precipitation of any kind, or at temperatures below 10° C (50° F).

3.4.3 The saw cut and drilled holes shall be completely filled with sealant, allowing no bubbles below the surface and only a minimum spill-over along the joint. Duct-Seal shall be used to prevent sealant from flowing into conduit ends.

3.4.4 When the sealant hardens, there shall be neither a bulge or depression, but rather a smooth road surface. The sealant shall not be over-poured so there is a bulge or bump higher than the surrounding surface of the roadway. It shall be wiped smooth with a squeegee.

3.4.5 The Contractor should make sure that the sealant has hardened before allowing traffic to move over the area.

4. METHOD OF MEASUREMENT -

4.1 Detector loops shall be measured by LINEAR FEET (METRE) of: loop wire, lead-in cable, and saw cut as actually placed, including sealant, electrical connections, testing, and incidental hardware. Note that conduit and vehicle detector amplifiers are measured elsewhere as separate items.

5. BASIS OF PAYMENT -

5.1 Detector loops, measured as provided above, shall be paid for at the contract unit price bid for:

Loop Wire:

NO. 14 COPPER WIRE 1-CONDUCTOR, 19 STRANDS, BARE COPPER WIRE-- LINEAR FEET (METRE)

Loop Lead-in cable:

NO. 14 COPPER WIRE 4-CONDUCTOR GRAY -- LINEAR FEET (METRE)
NO. 14 COPPER WIRE 8-CONDUCTOR GRAY -- LINEAR FEET (METRE)
SAW CUT -- LINEAR FEET (METRE)

[illegible]

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NOTE: L SHALL BE 50 -2500 μ h; R SHALL BE >100 M Ω @ 500 VDC

SUBMITTED BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
IN SERVICE BY	DATE	TIME	CHECKED BY	DATE	TIME

FURNISH AND INSTALL ELECTRIC SERVICE

DESCRIPTION - This work consists of furnishing and installing complete Electrical Services to provide electric power to traffic signals, at locations shown on the Plans, and in accordance with Power Company procedures.

1. GENERAL -

1.1 Standards -

All work is to be in accordance with the signal Installation Details, the Standards, or the REQUIREMENTS OF THE LOCAL POWER COMPANY. All work shall be in accordance with the National Electric Code (NEC), and applicable local Codes.

1.2 Meeting -

The Resident Construction Engineer, the CONTRACTOR, and the Power Company Representative shall discuss the project at the "Pre-Construction Meeting", and arrange the schedule for power connection. Additional meetings will be held as necessary to satisfy all concerns about Electrical Service.

1.3 Representative -

The Power Company Representative for this project is:

For the name and address of the local utility company:

SC DOT Utility Engineer
Room 322
955 Park Street
Columbia, SC 29202
(803)-737-1293

1.4 Schedule -

The CONTRACTOR shall make all necessary arrangements with the Power Company to ensure having the needed power available at the TIME OF SIGNAL TURN-ON. Difficulties in securing the service of the Power Company are to be immediately reported to the Engineer.

1.5 Location -

The CONTRACTOR shall determine the exact location of the electric service. The nature of the service is shown on the Plans, but shall also be finalized as: 1) Overhead service drop to controller pole; 2) Overhead service drop to service pole, then underground to controller (isolated); or, 3) Underground Power Company feed, to service on the back of controller cabinet.

1.6 Meter -

The electric service will usually be METERED. The CONTRACTOR shall provide hardware accordingly.

2. MATERIALS -

The power connection shall be a SINGLE-PHASE, 120/240 VOLT, 3-WIRE, 60 Hertz alternating current supply.

2.1 Meter -

The CONTRACTOR shall furnish and install the METER BOX (PAN), and the HUB.

2.2 Disconnect Switch -

The disconnect switch shall be NEMA STANDARD TYPE 3R, weatherproof. It shall be CIRCUIT BREAKER TYPE, and have a tab for pad-locking the cover closed. It shall be of 3-WIRE DESIGN (2-circuit), with solid neutral. The CONTRACTOR shall twist a No. 6 AWG wire through the padlock tab, to prevent unauthorized entry (until the District installs their own padlock).

2.3 Rating -

To provide a maximum of future flexibility, and a minimum of voltage-drop to the lamps, the components of the electrical service shall have the ratings stated in the following table:

ITEM	USAGE	
	FLASHING BEACONS	TRAFFIC SIGNAL
<u>DISCONNECT BREAKER:</u>		
Box Rating: (for uniformity)	60 AMP	60 AMP
Circuit Breaker (one side)	20 AMP	50 AMP
<u>CABLE:</u>		
3-Wire (W, BL, RD), THHN/THWN No.6 AWG	No.6 AWG	
<u>CONDUIT:</u>		
PVC Schedule 80	25 mm (1 in.)	25 mm (1 in.)

2.4 Ground Rod -

One or more ground rods shall be installed --at the service pole; and where applicable, at the controller itself.

The ground rod shall be 16 mm by 2.4 metres (5/8 inch by 8 feet) (minimum), copper-clad, with brass or bronze ground rod clamp. **The controller ground rod shall be EXOTHERMICALLY WELDED.**

2.5 Ground Wire -

The grounding wire for the service shall be No. 6 AWG, Bare, solid or stranded copper wire. (Note that this is in addition to the solid grounding wire running down each wooden pole.)

2.6 Conduit -

Conduit and Fittings used for the Electric Service shall be PVC Schedule 80, 25 mm (1 inch) DIAMETER. It shall extend from the point of Power Company attachment, through the meter and disconnect assembly, to the controller cabinet. (See FURNISH AND INSTALL ELECTRICAL CONDUIT.)

2.7 Weatherhead -

A weatherhead mating to the above conduit shall be used with overhead service connections. Also used shall be a strain Clevis, to create a 200 mm (1 ft.) minimum drip loop.

2.8 Cable -

The electrical cable installed from the point of Power Company attachment to the Controller Cabinet, shall be: Type THHN/THWN, sized per above table, 3-WIRE, (White, Black, red) 600 Volt, Copper only, stranded, with cable lugs. At no place shall the service cable be in the same conduit as signal cables or loop lead-ins.

2.9 Hardware -

All hardware used shall be rustproof: steel parts shall be stainless steel or galvanized. STAINLESS STEEL BANDS shall be used for attachment to steel poles. The bands are to be spaced every 1.0 metre (3 ft.) maximum, and at the top and bottom of the pole. When specifically required by the Utility Company or on wood poles, Conduit Clamps/strap, fastened with galvanized screws, may be substituted for the bands.

3. **CONSTRUCTION METHODS** -

3.1 The Electrical Service shall be installed in accordance with all applicable Codes, Regulations, and the REQUIREMENTS OF THE POWER COMPANY, with the final location being determined in the field. Typical construction methods are shown on the Installation Details, and the Standards.

3.2 The CONTRACTOR shall obtain all ELECTRIC PERMITS required; and shall arrange for INSPECTION at completion.

4. EQUIPMENT POWER -**4.1 Normal -**

The Type 170 Power Supplies with additional cabinet surge protection, for equipment for this Contract, (while operating from a 115 VAC, $\pm 10\%$, Sixty (60) Hertz, commercial grade, non-dedicated power service), shall be capable of providing the following:

4.1.1 Proper regulation for AC outputs, up to one-hundred and fifty (150%) percent of normal load.

4.1.2 Sufficient internal electronic noise and transient immunity, so that equipment fed by this service will not be effected by either noise or transients.

4.1.3 Equipment power supplies of sufficient design to prevent extraneous coupling of signals between equipment.

4.1.4 Complete internal surge protection (in addition to that of the Controller Cabinet).

4.2 Additional -

Where electronic problems can be traced to Radio Frequency Interference (RFI), as shown by an oscilloscope, then the CONTRACTOR shall provide additional isolation, filters, capacitors, etc. to eliminate the problem.

5. GROUND SYSTEM -

5.1 The resistivity of the electrical system EARTH GROUND shall be FIFTEEN (15) OHMS OR LESS, as measured with an appropriate instrument which was calibrated not more than sixty (60) days prior to the date of performing such tests. The poles, ground rods, ground wires, span wires, etc. forming the traffic signal, are intended to form a "GROUNDING ELECTRODE SYSTEM" as defined by Article 250 of the NATIONAL ELECTRIC CODE.

6. METHOD OF MEASUREMENT -

Complete Electric Services shall be measured by EACH service installed in place, as shown on the Plans. It shall include all necessary conduit (trenched and/or riser), cable, conduit fittings, hardware, ground rod, banding, clamps, lugs, and all other materials and equipment specified or directed by the Engineer or Power Company. (Usually, there shall be no additional measurement of electrical cable used; there shall be no additional measurement of conduit used.) When an "Isolated electric service" is required by the Plans, an item and quantity will have been provided for wooden pole, as required.

7. BASIS OF PAYMENT -

Complete Electric Services, inspected, accepted, and measured as above, shall be paid for at the Contract Unit bid for—

ELECTRIC SERVICE FOR TRAFFIC SIGNAL – EACH

which shall be full compensation for furnishing riser, meter, disconnect switch, and all materials, equipment, labor, and incidentals to complete the work as specified.

FURNISH AND INSTALL SPLICE BOXES / JUNCTION BOXES

DESCRIPTION - This work shall consist of furnishing and installing Splice Boxes or Junction Boxes at the locations shown on the Plans in accordance with these Specifications. The Splice Box shall consist of a Box and Cover, installed over aggregate. The Splice Box is intended for use as a signal cable electrical enclosure. The Junction Box is intended for use as a loop detector "junction point".

Unless shown mounted on a pole, it shall be installed in the dirt, at the depth of the conduit run, and covered with earth.

1. MATERIALS -

Shall meet the following requirements:

1.1 Box and Cover -

1.1.1 The Splice Box shall consist of a Base having an open top (the Box), with a separate removable Cover. They shall be made from a lightweight, blended modern material, using fiberglass reinforcement, and shall be NON-CONCRETE / NON-STEEL. They shall be GRAY IN COLOR. Covers shall have the LEGEND "TRAFFIC SIGNAL". They shall use HEX-HEAD stainless steel bolts. The PHYSICAL FEATURES AND THE NOMINAL SIZE AND DIMENSIONS for the Box and Cover, are shown on the Standards or the Design Details, and are listed below--

	<u>WIDTH</u>	<u>LENGTH</u>	<u>DEPTH</u>
SPLICE BOX:	3m (13in)	.61m (24in)	46m (18in)
CUSTOM SPLICE BOX:			
(bridge deck use)	.3m (12in)	.3m (12in)	.3m (12in)
		cut to .15m (6in)	

1.1.2 The above "Custom Splice Box For Bridge Deck Use" shows the manufactured size. The Contractor shall CUSTOMIZE the Box by using a masonry cut-off saw to manually cut it to a nominal depth of .15 metres (6 inches), to fit flush with the finished surface of the bridge side walk.

1.2 Design Load -

Boxes shall be designed to survive a tandem wheel load specified by AASHTO H 20-44, being 32,000 pounds (14,514.9 kg) per axle, or 16,000 pounds (7257.6 kg) per tandem wheel pair. This 16,000 pound (7257.6 kg) dead load shall be multiplied by 1.3 impact factor, to obtain the DESIGN TEST LOAD OF 20,800 pounds (9434.7 kg). Thus, boxes shall be designed and tested for the following test loads:

Cover- vertical load 20,800 pounds distributed over a 10in x 20in area (9434.7 kg over .254 x .508 m). Box- vertical load 20,800 pounds distributed over a 5in x 20in area (9434.7 kg over .127 x .508 m). Box- lateral load of 600 pounds per square foot (28728 Pascals). The cover

deflection shall be less than 0.5 inch (1.27 cm); and the box deflection less than 0.25 in/ft of length (.635 cm/.3 m).

(Because of quoted references, english units are first.)

1.3 Western Underground Committee (WUC) -

Using the above specified loads, the Splice Box shall meet or exceed the WUC "Recommended Guide No. 3.6, Non-Concrete Enclosures". Structural Requirements shall include: testing for Vertical Load on Cover; Vertical Load on Box; Lateral Load on Box. Further they shall meet WUC recommendations for: Accelerated Service per ASTM D-756; Chemical Resistance per ASTM D-543; Simulated Sunlight Resistance per ASTM G-53; plus Water Absorption; and Flammability. Covers shall be skid-resistant, with a minimum coefficient of friction of 0.5.

1.4 Concrete -

Concrete for patching shall be DOT Class A, mixed and installed in accordance with Section 700 of the STANDARD SPECIFICATIONS.

1.5 Aggregate -

Crushed stone for the Splice Box shall be DOT Aggregate Numbers 5 or 57.

2. CERTIFICATION -

2.1 The CONTRACTOR SHALL FURNISH certification from the Manufacturer or Vendor that the above material specifications have been met, including written results for Western Underground Committee tests.

NOTE: CATALOG CUTS ARE REQUIRED.

2.2 The Contractor shall provide the Department with all guarantees offered by the Manufacturer.

3. CONSTRUCTION METHODS -

3.1 Construction -

3.1.1 The Splice Box shall be constructed as indicated in the Design Details or the Standards, at locations shown on the Plans.

3.1.2 The Splice Box shall be constructed such that when the Box and Cover are in place, they are flush with the adjacent pavement, ground, or sidewalk, as shown in the Design Details or the Standards. Patching Concrete shall be placed around any Box installed in pavement.

3.1.3 Boxes shall be placed at least 0.3 metres (1 ft) behind the curb-line or edge of roadway or as shown on the plans.

3.1.4 Placed Before Pouring. Where shown on the Plans, Custom Splice Boxes shall be placed in roadways or structures, prior to pouring the concrete. Typical usage would be in a bridge deck. The incoming conduit shall be firmly attached to the bottom reinforcement bar mat,

or to the bottom wire-mat, using plastic tie-wraps every 0.6 metres (2 feet). CAUTION: THE BOTTOM OF THE SPLICE BOX AND THE CONDUIT ENDS ETC. SHALL BE COMPLETELY PLUGGED/BLOCKED/SEALED TO PREVENT CONCRETE PENETRATION. When used on a bridge, the Splice Boxes will be near the center line, and the conduit will terminate in Splice Boxes at each end.

3.2 Conduit -

3.2.1 See FURNISH AND INSTALL ELECTRICAL CONDUIT

3.2.2 Conduit shall enter the Box at the bottom and extend at least 5 cm (2 in) beyond the inside wall.

3.2.3 Conduit shall enter from the direction of the run unless otherwise permitted by the Engineer.

3.2.4 All metallic conduit ends within the Box shall have grounding bushings with plastic inserts; and shall be bonded with one another with #6 AWG bare copper ground wire. Plastic conduits shall have end bushings to prevent chaffing.

3.2.5 After the electrical cable is placed, the completed conduit ends shall be packed with "duct-seal" or other equivalent material to prevent water from entering the conduit. Spare conduit shall be capped.

4. METHOD OF MEASUREMENT -

Furnishing and installing Splice Boxes will be measured by EACH Box placed complete, including Box, Cover, aggregate, patching concrete, ground wire, ground bushings, sealing, and all miscellaneous hardware and incidentals required.

Furnishing and installing Junction Boxes will be measured incidental to the conduit to which it is used with.

5. BASIS OF PAYMENT -

Furnishing and installing Splice Boxes, accepted and measured as provided above, will be paid for at the contract unit price bid for:

Splice Box:

13"X24"X18"D (.33X.61X.46D M) ELECTRICAL FLUSH ENCLOSURE
(STR.POLY.CONC)--EACH

Custom Splice Box for bridge deck use (cut to 6"D .15 m):

12"X12"X12"D (.3X.3X.3 M) ELECTRICAL FLUSH ENCLOSURE
(STR.POLY.CONC)--EACH

which shall be full compensation for furnishing all materials, equipment, labor, and incidentals necessary to complete the work as specified.

FURNISH AND INSTALL CCA WOOD POLES

DESCRIPTION - This work consists of furnishing and installing CCA treated wood poles, of the types and sizes shown on the Plans, in accordance with these Specifications, and in close conformity with the lines shown on the Plans, or as established by the Engineer. Each wood pole installation shall include all related overhead and underground hardware, and back guy assemblies as provided elsewhere.

1. MATERIALS -

Materials used shall meet the following requirements:

1.1 Wood Pole -

1.1.1 Wood -

Each pole shall be Southern Yellow Pine, that is cut, stored, seasoned, and manufactured in accordance with specification ANSI 05, 1-19-79. Prohibited defects include: red heart, shakes in the tops of poles, short crooks, double-sweep, splits or through-checks, nails & spikes, and excessive knots. Scars shall not be deeper than 2.5 cm (1 inch), nor longer than one (1) metre (3 feet). Poles shall not have excessive butt-swell, nor more than one twist per pole length. Sweep in two planes is prohibited.

1.1.2 Straightness -

All poles shall be straight to the extent that a line drawn from the center of the butt end, to the center of the tip end shall lie within the middle two-thirds of the body of the pole at all points. Poles shall also be free from short crooks, in which the surface deviation from straightness in any 1.5 metres (5 feet) of length, exceeds 38 mm (1.5 inches) at any location, as determined by a straight edge.

1.1.3 Treatment -

Each pole shall be prepared and pressure-treated in accordance with American Wood Preservers Association (AWPA) Standards C1, C3, C4, and M1. Treatment shall be "SALT TREATED", CCA- CHROMATED COPPER ARSENATE, and shall conform to AWPA Standard P5. The retention of the treatment shall be tested in accordance with AWPA Standard M2. The minimum penetration shall be 7.6 cm (3 inches), or 90 percent of the sap-wood. The retention shall be at least 9.6 kgs per cubic metre (0.60 POUNDS PER CUBIC FOOT), as determined by AWPA Standards.

1.1.4 Size -

EACH POLE SHALL BE CLASS II. THE LENGTH SHALL BE EITHER:
10.7 METRE (35 FEET), 12.2 METRE (40 FEET) -or- (45 FEET)
or as stated on the Plans.

1.1.5 Brand -

Each pole shall have a "brand" 3.6 metres (12 feet) above the butt-end, showing the Manufacturer. Plant-location with month and year of treatment, "Southern Pine CCA 0.60 (9.8)", and the Pole Class and Length. A Metal Tag showing Pole Length and Class shall be fixed to the butt-end; and the Length and Class shall be stamped on the top-end.

1.1.6 Inspection -

Each pole shall have the "Brand Mark" of an inspection-company that has been approved by the Department.

1.2 Back-Guy Anchor -

Wood Poles for traffic signal usage, require the installation of one-or-more back-guy cable assemblies, as needed. (See FURNISH AND INSTALL BACK-GUY.) The installation shall be made in accordance with the Installation Details, or the Standards.

1.3 Ground Wire -

Each pole shall be grounded in accordance with the Installation Details or the Standards. A No. 6 AWG, SOLID, bare-copper ground wire (ASTM B2) shall run the length of wooden poles, and extend 15 cm (6 inches) above the top end.

1.4 Ground Rod -

The Ground Rod shall be copper-clad, conforming to EEI-TDJ-30, having a minimum size of 1.6 CM DIAMETER BY 2.4 METRES IN LENGTH (5/8 inch by (8 feet)). A ground rod clamp shall also be used (heavy duty bronze or brass).

2. CONSTRUCTION -

2.1 Location -

The general location of each pole is shown on the Plans. The Contractor shall determine the final location of the pole, which shall be approved by the Engineer. Consideration shall be given to the property lines, underground utilities, and overhead clearances (including the guy anchor assembly).

2.2 Hole -

A hole shall be drilled TWO METRES (6 feet) DEEP, or as shown on the Plans. The diameter shall be larger than the pole by approximately 10 cm (4 inches) all around. The hole shall be of uniform diameter, and cleanly augured.

2.3 Sidewalk -

When the pole is installed in a sidewalk, then the hole shall be cleanly cut 15 cm (6 inches) larger than the pole on all sides. After installation of the pole, and back filling the hole, then expansion joint material shall be placed around the pole, and tacked in place. Conduit running to the pole shall be installed at this time, in the cut. Concrete shall be poured around the pole to a depth of 10 cm (4 inches) and neatly troweled level. This work shall be considered incidental to pole installation, unless a pay item has been established for concrete patching or side walk.

2.4 Installation -

Poles shall be vertical, except at corners, where they shall be RAKED away from the strain, 5 to 10 cm (2 to 4 inches) per 3 metre (10 feet) length. Back guy assemblies shall be installed in

line with the strain of each span wire. After installing, the hole shall be back-filled with clean earth or sand (no rocks or debris), placed in 30 cm (1 foot) layers; each layer moistened and compacted. Excess earth shall be removed from the site. (A 5 cm (2 inch) mound around the pole base is acceptable.)

2.5 Utility Poles -

Where poles are to be used for joint-use UTILITIES, they shall be installed in accordance with all local codes, and with the requirements of the Utility Company. Cross Arms shall be provided if required by the Utility Company.

2.6 Grounding -

Each pole shall have a No. 6 Bare SOLID copper ground wire running the entire length. The ground wire shall be securely attached and bonded while the wood pole is laying on the ground. It shall extend 15 cm (6 inches) above the top end, have a 60 cm (2 foot) coil (slack) at the top end, and extend down to the bottom, and have another 60 cm (2 foot) coil on the bottom end. The ground wire (and the coils) shall be attached using galvanized 30 mm (1-1/2 inch) wire staples, on 60 cm (2 foot) centers above 3 metres (14 feet), and on 30 cm (1 foot) centers below 3 metres (14 feet). (The spacing change will be at 2.4 metres (8 feet) above grade.)

2.7 Ground Rod -

One wood pole at each intersection shall have a GROUND ROD. Usually this would be the pole having the electrical service from the Power Company. The ground rod shall be driven vertically into the earth, until it extends about 5 cm (2 inches) above local grade. Then a separate No. 6 AWG bare, STRANDED copper wire shall be used to bond the electrical service and the overhead cable (and pole ground wire) system to the ground rod, using a grounding clamp.

2.8 Back Guying -

Each wood pole that is used to support signal span wires, shall be back guyed. Wood poles used to support messenger cables could require back guying, especially at turns. (See FURNISH AND INSTALL BACK GUY.) It is the responsibility of the Contractor to install sufficient numbers of back guy assemblies, to insure the stability of wood pole installations. This may include: double-guying; extra large anchors; or Re-guying Utility Company poles. A quantity for "Back Guy" has been established in the Bid or Proposal. The Contractor shall inform the Engineer when additional back guy assemblies are required. When the back guy is installed in a side walk, then the procedures of paragraph 2.3 above shall be followed.

3. ACCEPTANCE -

Acceptance of each wood pole shall include checking for the pressure-treatment inspection company Brand Mark, plus visual inspection by the Engineer. The visual inspection shall be made of the pole, overhead cables, grounding, and back guy assembly. The complete installation shall be structurally sound, and the final pole placement shall be vertical, or raked as specified. Poles NOT meeting this inspection, shall be replaced by the Contractor, without further cost to the project.

4. METHOD OF MEASUREMENT -

Furnishing and installing wood poles, will be measured by EACH, of the Size specified, erected in place as shown on the Plans, including grounding, and all miscellaneous hardware and related work activity as required.

5. BASIS OF PAYMENT -

Furnishing and installing wood poles, accepted, and measured as above, will be paid for at the contract unit price bid for:

35 /40/45 FOOT WOOD POLE, CLASS II -CCA TREATED -- EACH;

which shall be full compensation for furnishing all materials, equipment, labor, and incidentals necessary to complete the work as specified.

FURNISH AND INSTALL BACK-GUY

DESCRIPTION - This work consists of furnishing and installing Back-Guy cable assemblies to secure wood poles, at locations shown on the Plans, and in accordance with these Specifications, and the Installation Details and Standards.

RESPONSIBILITY - It is the responsibility of the CONTRACTOR to assure that the number and size of Back-Guy assemblies is fully sufficient to anchor every wood signal pole, corner messenger cable pole, and Utility Company pole (where required).

1. MATERIALS -

Materials used shall meet the following requirements:

1.1 Assembly -

From the top-down, a Back-Guy Assembly shall consist of: eye-type thru-bolt, guy-hook, strandvise (or 3-bolt clamp), jumper-bonding clamp, the steel cable (10 mm (3/8-inch) guy-cable stranded), another strandvise (or 3-bolt clamp), and a Screw-type guy anchor.

1.2 Rust Proof -

All parts shall be as shown on the Installation Details or the Standards. All hardware shall be hot-dip galvanized in accordance with ASTM Standard A-153.

1.3 Parts List -

Acceptable parts are listed below:

1.3.1 Guy Anchors - One piece screw type guy-anchors, shall conform to EEI-TD-2, 25 mm (1 in.) diameter, 2.4 METRES (8 FEET) LONG, thimble eye type. (Joslyn No. J-6550-WCA or approved equal)

1.3.2 Guy Guards shall conform to REA Item "AT" yellow plastic (PVC) sunlight resistant, 2.4 metres (8 ft.) long.

1.3.3 Spool Insulators shall conform to REA Item "CM".

1.3.4 Strain insulators shall conform to REA Item "W".

1.3.5 Machine Bolts shall conform to REA Item "C".

1.3.6 'J' hooks shall be Reliable No. 5552 (or approved equal).

1.3.7 Reliable Universal Strandvise (or approved equal) shall be used for guy and messenger cable deadends.

1.3.8 Thimbleye Bolts shall conform to EEI-TD-4.

1.3.9 Thimble Nuts shall conform to EEI-TDJ-5.

1.3.10 Washers shall conform to EEI-TDJ-10.

1.3.11 Angle Thimbleye shall conform to REA Item 5.

1.3.12 Cable- SEE FURNISH & INSTALL STEEL CABLE; using the 10 MM (3/8 IN) DIAMETER CABLE SIZE.

1.3.13 Cable Clamps: 3-bolt clamps shall conform to EEI-TDJ-23, (100 mm (4 in.) and 150 mm (6 in.) sizes)

1.3.14 Clevises shall conform to EEI-TD-20.

1.3.15 Side-walk Bridge-over shall be a stress supporting spreader-type, bolting to the wood pole.

2. CONSTRUCTION -

2.1 A Back-Guy Assembly shall be installed: 1) Where shown on the plans; 2) In conjunction with installation of Steel Cable as span wire; 3) In conjunction with the installation of a wooden pole; 4) Where required by the Utility Company to "dress" pole to which signal equipment is attached; or, 5) At corner/turning wood poles that are used for messenger cable runs.

2.2 The installation of the wood pole, Back-Guy Assembly, and the span wire, shall have the construction staged for the safety of the motorist, pedestrian, and signal construction worker.

2.3 See FURNISH AND INSTALL WOOD POLE.

2.4 The span wire and Back-Guy Assembly shall be stretched, adjusted, and then RE-ADJUSTED to produce the specified amount of span wire sag, the proper signal head road-clearance, and still create a nearly vertical wood pole.

2.5 The CONTRACTOR shall assure that the Back-Guy Assembly is sufficiently strong to handle the pull of all span wires. This shall include consideration of the earth/soil type into

which the ground anchor is buried. The CONTRACTOR shall furnish EXTRA LARGE ANCHORS and/or MULTIPLE-ANCHOR ASSEMBLIES if needed. Special anchors shall be used for solid rock.

2.6 Where a pedestrian sidewalk is adjacent to a wood pole, the CONTRACTOR shall furnish as an incidental item, a sidewalk "bridge-over" assembly.

2.7 The compass angle of the Back-Guy shall be reasonably IN LINE with the strain of the overhead cable: that is, in line with each span wire. Thus most signal poles should have two (2) Back-Guys, installed at right angles to each other. The use of a single diagonal Back-Guy is generally unacceptable.

2.8 The Back-Guy shall be installed (wherever possible) to provide as a minimum: rise=2 / run=1 (i.e. 2/1). For example, if the Back-Guy is attached at 8 metres (26 feet), the anchor should be at a minimum of 4 metres (13 feet) from the pole. This corresponds to an angle with the earth of about 60 degrees.

2.9 All work shall be performed within the public Right of Way, and particular care shall be taken to assure that the Back-Guy does not extend into private property.

2.10 The Back-Guy shall be installed where it will not interfere with traffic, giving particular attention to private driveways. Where damage is likely (say, edge of driveway). then a STEEL GUY GUARD shall be installed to protect the cable. When shown on the Plans, a CONCRETE TIRE/WHEEL STOP (curb) shall be placed at the base of the Back-Guy, anchored/pinned with 400 mm (2 ft.) pieces of reinforcement bar.

2.11 NO splices shall be allowed in the steel cable.

3. INSPECTION -

The Engineer shall inspect each installation of wood pole, span wire, signal heads, and Back-Guy, for proper clearance, dress, and tension. At the direction of the Engineer, the CONTRACTOR shall re-install or replace improper installations, without further compensation.

4. METHOD OF MEASUREMENT -

Furnishing and installing Back-Guy Assemblies, will be measured by EACH, erected in place in accordance with the Specifications and as shown on the Plans, including all miscellaneous hardware as required.

Additional Back-Guy Assemblies that are installed for reason of situations or conditions that arise during construction, will be paid, and shall be measured by EACH.

5. BASIS OF PAYMENT -

Furnishing and installing Back-Guy Assemblies, accepted, and measured as above, will be paid for at the contract unit price bid for:

3/8 INCH (10 MM) BACK-GUY FOR WOOD POLE – EACH

which shall be full compensation for furnishing all materials, equipment, labor, and incidentals necessary to complete the work as specified.

FURNISH AND INSTALL STEEL CABLE

DESCRIPTION - This work shall consist of furnishing and installing splice-free lengths of Steel Cable with cable supports, for mounting signal heads, signs, interconnect runs, installing back guys, etc., at locations shown on the Plans or as established by the Engineer.

1. MATERIALS -

Materials shall meet requirements listed below:

1.1 Fabrication -

1.1.1 Steel Cable shall be fabricated of seven (7) steel wires, Class A double galvanized in accordance with ASTM A-475, and twisted into a single concentric strand to conform with the following schedule:

Diameter mm	(inches)	Strand Size (AWG)	Tensile Strength Newtons (pounds)
6.35	(1/4)	14	14,011 (3,150)
9.53	(3/8)	11	30,913 (6,950)
11.1	(7/16)	9.5	41,488 (9,350)
12.7	(1/2)	8	53,376 (12,000)

1.2 Usage -

1.2.1 Span Wire -

All Steel Cable used as span wire shall be 9.53 mm (3/8 inch) in diameter, unless otherwise noted on the Plans.

1.2.2 Messenger Wire -

All Steel Cable used as messenger shall be 6.35 mm (1/4 inch) in diameter, unless otherwise noted on the Plans.

1.2.3 Tether Wire -

All Steel Cable used as tether wire shall be 6.35 mm (1/4 inch) in diameter, unless otherwise noted on the Plans.

1.2.4 Back Guy -

All Steel Cable used for back guying shall be 9.53 mm (3/8 inch) in diameter, unless noted otherwise on the Plans.

1.3 Cable Supports -

1.3.1 Aluminum Tie-wrap -

Shall be Flat Aluminum Armor Tape, 1.2 mm (0.05") Thick X 7.6 mm (0.30") Wide, typically furnished in 4.5 kg (10 pound) coils.

1.3.2 Where specifically required, Support Rings (also called "cable rings", "messenger rings") shall be galvanized in accordance with ASTM A-153, and the design approved by the Engineer, and shall be 3 to 8 cm (2 to 3 inches) in diameter (to contain the Electrical Cables), and sized to specifically match the Steel Cable.

1.4 Miscellaneous Hardware -

1.4.1 All hardware and fittings shall be of the type shown on the Standards or the Construction and Installations Details.

1.4.2 All hardware and fittings shall be made of galvanized steel or non-corrosive metal. The tensile strength of all hardware shall be equal-to or greater-than the Steel Cable installed.

1.4.3 All thimble-eye and oval eye-bolts used to connect the automatic compression dead-end clamps to wooden poles, shall be (5/8 inch) diameter. Fiberglass insulators shall be fabricated from epoxy-resin impregnated fiberglass strands, and have a tensile strength fifty (50%) percent greater than the Steel Cable.

2. CERTIFICATION -

2.1 The CONTRACTOR SHALL FURNISH a Certification from the Manufacturer or Vendor, that the Steel Cable has been tested to meet or exceed the required tensile strength.

3. CONSTRUCTION METHODS -

3.1 Span Wire -

3.1.1 General -

All Span Wire shall be installed as shown the Standards, or on the Construction and Installation Details. Note that different methods and materials are required for Wood Poles and Steel Poles.

A. Before erecting the Span Wire, the Contractor shall determine the length of cable required to span the distance indicated on the Plans. Sufficient additional length shall be allowed to compensate for sag, pole connections, and adjustments, to make the whole assembly consistent with the Design Details, or the Standards. NO MID-SPAN SPLICES SHALL BE PERMITTED.

B. The Contractor shall set the Span Wire so that the height of the installed signal heads, including all hardware, shall conform to the clearances shown on the Design Details or the Standards, or as directed by the Engineer.

C. The Span Wire shall not be permanently "tied-off" until all signal heads, signs, and cables are in place.

D. The Contractor shall not erect any Span Wire which lays on, or is likely to rub a Utility Company's cable. If a Span Wire, as erected, is within 15 cm (6 inches) of any other cable, wire, or structure, it shall be protected with plastic wire-guards.

E. When required by the Utility Company, or by the applicable electrical Code, strain-type fiberglass insulators shall be installed.

3.1.2 Cables from STEEL POLES -

Steel Poles are essentially electrical conductors.

A. A Roller Type Pole Clamp shall be used, attached at the proper height.

B. The free-end of the cable shall be secured with a 15 cm (6 inch) galvanized steel clamp, with 16 mm (5/8 inch) galvanized bolts. The clamp shall be placed approximately 30 cm (1 foot) from the pole. Cable-grips are not permitted.

C. The ends of the cable shall be covered with "servisleaves" to prevent unraveling.

D. The SAG shall be THREE (3%), TO FIVE (5%) PERCENT, fully loaded.

3.1.3 Cables from WOODEN POLES -

Wooden poles are essentially electrical insulators, and thus require extensive GROUNDING and BONDING procedures, as shown on the Construction and Installation Details, and the Standards.

A. The SAG shall be typically FIVE (5%) PERCENT, fully loaded.

B. The height of attachment shall be sufficient to provide the required road-clearance, including sag.

C. Shall be installed in accordance with the requirements of the Utility Company.

D. May require the installation of a back guy assembly as required in FURNISH AND INSTALL BACK GUY.

E. Shall be electrically bonded.

3.2 Messenger Wire -

3.2.1 Where Messenger Wire is attached to traffic signal poles, it shall be installed in the same manner as specified for span wire, but with relatively little sag.

3.2.2 Where Messenger Wire is attached to utility poles, it shall be installed in accordance with the UTILITY COMPANY'S SPECIFICATIONS.

3.3 Tether Wire -

Where Steel Cable is specified to tether signal heads and/or traffic signs, it shall be installed in the same manner as specified for span wire, but with relatively little sag.

3.4 Back Guy -

See FURNISH AND INSTALL WOOD POLES. See FURNISH AND INSTALL BACK GUY. See the CONSTRUCTION AND INSTALLATION DETAILS.

3.5 Cable Supports -

3.5.1 Cable supports shall be used to support electrical cables from span wire and messenger wire. Cable Supports shall be spaced at 25 CM (10 INCH) INTERVALS.

3.5.2 When Aluminum Tie-Wraps are used, they shall be installed by wrapping 3-full turns TIGHTLY around the bundle formed by the steel cable and all electrical cables, then cutting off from the tape coil.

4. METHOD OF MEASUREMENT -

4.1 Steel Cable of the SIZE specified shall be measured by the LINEAR FOOT (METRE) of material as actually placed, which shall include cable supports, clamps, insulators, and all other miscellaneous hardware and fittings.

4.2 Steel Cable used for back guying, is included under FURNISH AND INSTALL BACK GUY.

5. BASIS OF PAYMENT -

Accepted quantities of Steel Cable, measured as stated above will be paid for at the contract unit price bid for:

For span wire:

3/8 INCH (9.53 MM) GALV. STEEL CABLE -- LINEAR FOOT (METRE)

For bottom tether cable or as messenger:

1/4 INCH (6.35 MM) GALV. STEEL CABLE -- LINEAR FOOT (METRE)

(or other sizes as shown on the plans), and such payment shall be full compensation for furnishing and placing the cable, support rings, clamps, S-hooks, turnbuckles, and other incidentals required to complete the work as specified.

FURNISH AND INSTALL CONTROLLERS AND CABINETS

DESCRIPTION - This item consists of furnishing and installing NEMA or Model 170 Standard, digital, solid-state, micro-processor based, keyboard (push-button) programmable, Local Controllers in: (1) POLE-, or (2) BASE- MOUNTED Cabinets, in accordance with these Specifications, at the locations shown on the Plans, or directed by the Engineer. This item shall include all electrical accessories and other items specified.

1. **MATERIAL** -

Materials shall meet the requirements below:

1.1 **Controllers** -

Type 170 Controllers shall precisely match the current SC DOT controller in every respect. NEMA Controllers shall comply with the SC DOT Specification "**TRAFFIC SIGNAL CONTROLLER**", which is available from SCDOT; Traffic Signal & Systems Engineer; (803) 737-1050.

1.1.1 The phasing of the Controller and Cabinet shall be factory wired or wired by the CONTRACTOR or Manufacturer's Representative, to match (at each intersection) the Phasing Diagram, the Sequence of Operation form, or the Plans.

1.2 **Cabinets** -

Type 170 Cabinets shall precisely match the current SC DOT cabinet in every respect. NEMA Traffic signal Cabinets (complete with Conflict Monitor, Load Switches, and accessories) shall comply with the SC DOT Specification "**TRAFFIC SIGNAL CABINETS**", which is available from SCDOT; Traffic Signal & Systems Engineer; (803) 737-1050

1.3 **Detector Amplifier** -

See FURNISH AND INSTALL VEHICLE LOOP DETECTOR AMPLIFIERS. When detector amplifiers are required as part of a "turn-key" signal project, the detector harnesses shall be connected to the Cabinet back-panel according to the Plans (phase and approach) or the Loop Wiring Chart. Each harness and connector shall be clearly labeled as to loop number and phase.

1.4 **Cabinets (continued from 1.2)** -

1.4.1 **Pole Mounted Cabinet** -

A. Size. Minimum nominal size is TYPE 3 (or 336S FOR 170).
B. Hardware. Top and Bottom Mounting Brackets and all related hardware shall be galvanized per ASTM A-123, or be stainless steel, or aluminum. Mounting Straps shall be stainless steel.

1.4.2 **Base Mounted Cabinet** -

A. Size. Minimum nominal size is TYPE 4 (or 332A FOR 170).
B. Hardware. Complete hardware shall be furnished with each Cabinet, including Anchor Bolts, nuts, clamps and all other related hardware. Hardware shall be galvanized per ASTM A-123, or be stainless steel.

1.5 Concrete -

1.5.1 The Concrete provided shall be CLASS A, and shall be mixed, poured, and finished in accordance with SC DOT STANDARD SPECIFICATIONS, Section 701, 702, 703, and 704.

1.5.2 Base mounted Cabinets shall be furnished with a properly formed foundation, as shown on the Design Details or the Standards.

1.6 Reinforcing Steel. Steel reinforcement shall conform to the requirements of DOT STANDARD SPECIFICATIONS, Section 703.1.

The bars or wire shall be of the size and type shown on the Design Details or in the Standards.

1.7 Conduit Elbows -

See FURNISH AND INSTALL ELECTRICAL CONDUIT. Shall be of the size and type shown on the Plans or the Design Details or Standards.

1.8 Ground Rod -

Ground rods shall be 16 mm by 2.5 meters (5/8 in. by 8 ft.) (minimum) Copper-clad. A No. 6 AWG bare, stranded copper wire shall be used in the ground connection. A Base-mounted Cabinet requires a separate ground rod. A Pole-mounted Cabinet may use the ground rod associated with that pole.

1.9 Miscellaneous -

All components or hardware shall be made of non-corrosive material, or be of the same materials as the item being installed.

2. CERTIFICATION -

2.1 Prior to installing signals, the CONTRACTOR shall submit to the Engineer, design details and drawings in sufficient detail for complete evaluation of the materials, and comparison with these Specifications. Any exceptions to these Specifications must be stated in writing at that time.

NOTE: CATALOG CUTS ARE REQUIRED.

3. GUARANTEE -

3.1 The Contractor shall furnish the Engineer with any warranties or guarantees on all electrical or mechanical equipment that are provided by the Manufacturer or Vendor, as customary trade practice.

-and/or-

3.2 The Contractor shall warranty or guarantee the satisfactory in-service operation of all electrical or mechanical equipment and related components, for a period of **sixty days (60)** following project **FINAL PUNCHLIST ACCEPTANCE**.

4. CONSTRUCTION METHODS -

4.1 Plans -

The Bidder should carefully examine Plans, the Design Details, and the Standards which detail the construction of the required Pole- and/or Base-Mounted Cabinet(s). The Bidder is cautioned to visit and inspect the site, in person.

4.2 Concrete Foundation -

4.2.1 The foundation shall be constructed to the dimensions shown on the Design Details or the Standards. Bolt "circle" data shall be in accordance with the recommendations of the Cabinet Manufacturer. Suitable templates for setting anchor bolts shall be accurately set, and left in place until the forms are removed.

4.2.2 Concrete shall be mixed, placed, and tested in accordance with applicable portions of SCDOT STANDARD SPECIFICATIONS Sections 701, 702, 703, and 704.

4.2.3 Base mount Cabinets shall be set in place on a bead of silicon caulk.

4.3 Ground Rod and Ground Wire -

4.3.1 A ground rod and ground wire are to be furnished and installed with each Cabinet. The ground rod shall be placed near the cabinet's concrete foundation. A one inch(1") PVC conduit and elbow shall be placed in foundation prior to pouring as shown in the Design Details or the Standards. Ground wires(No. 6 AWG bare, solid or stranded copper wire) shall run continuously from the ground rod to the Controller Cabinet (chassis ground on the AC ground bar) through this conduit; and shall run continuously from the ground rod to the foundation anchor bolts, to the conduit bends, etc. Ground wires shall be **EXOTHERMICALLY WELDED TO THE GROUND ROD**. Grounding bushings shall be used on metal conduit. For Cabinets mounted on strain poles, the grounding stud on the pole shall also be connected.

4.3.2 The upper part of the ground rod shall be embedded in earth.

4.4 Conduit Elbows -

4.4.1 Conduit Elbows shall be set in the footing excavation before the concrete is poured. The size and number shall be as shown on the Design Details or the Standards; OR shall be that necessary to mate the incoming runs. Conduit shall extend beyond the side of the finished foundation by about 300 mm (12 inches), in the direction of, and at the depth of the incoming conduit. The conduit shall extend 80 to 150 mm (3 - 6 inches) above the top of the finished foundation, inside the pole or Cabinet.

4.4.2 The open-ends and threads on the conduit bends shall be covered and protected during construction activities.

4.5 Electrical Wiring -

4.5.1 All required equipment shall be installed in the Cabinet, and neatly wired with harnesses that have been tied or wrapped. Force-fitted or mutually interfering equipment is not acceptable. Cable harnesses and terminals shall be legibly labeled. All bare wires should be terminated in a "spade-lug" prior to connection to a terminal strip. The "spade-lug" shall be crimped-on, using a ratchet-type crimping tool. Wires not facilitating equipment movement, should be tied to the back or side-panel. Equipment should be installed and positioned for easy access. Opening and closing the Cabinet door shall not chaff the wiring.

4.5.2 The Cabinet, Controller, Local Coordination Unit, (Remote Communication Unit), and ALL associated equipment shall be made COMPLETELY OPERATIONAL, and ready for traffic duty.

4.5.3 Operation shall match the Phasing Diagram, the Sequence of Operation form, and/or the Plans.

4.5.4 Field (lamp) wiring shall have 1 metre (3 feet) of slack in each cable. The slack shall be coiled and tied neatly in the bottom of the Cabinet. Signal cables shall be separated from detector lead-in cables as much as possible, to reduce interference.

5. **METHOD OF MEASUREMENT** -

5.1 Local Controllers and Cabinets furnished and installed will be measured by EACH TYPE Controller and Cabinet (mounting specified); and erected in place as shown on the Plans including miscellaneous electronics, load switches, wiring, electrical connection, concrete, anchor bolts, reinforcing steel, ground rod, ground wire, concrete pad, and all related hardware.

5.2 Local Controllers furnished as spare/replacement units will be measured by EACH TYPE specified, and shall include all related harnesses with connectors.

FURNISH AND INSTALL POLYCARBONATE VEHICLE SIGNAL HEADS WITH LED MODULES

DESCRIPTION - This item consists of furnishing and installing POLYCARBONATE VEHICLE SIGNAL HEADS of the types, sizes, and mounting specified, in accordance with these Specifications.

Some heads require ALUMINUM sections. All SIGNAL HEADS shall be supplied with a 'RED', 'YELLOW' & 'GREEN' LED Module by the same manufacturer installed and operational.

1. **MATERIALS** – Signal Head with LED Modules factory installed:

All Signal Heads shall conform to the specifications of the INSTITUTE OF TRANSPORTATION ENGINEERS (ITE), "Standard for Adjustable Face Vehicular Traffic

Control Signal Heads" (latest Revision). All heads shall be furnished by the SAME MANUFACTURER as well as each module in the head. Polycarbonate Vehicle Signal Heads of the size, type, and arrangement specified, are to be furnished by the Manufacturer or Vendor, together with ALL the necessary hardware for make-up and mounting. The basic material requirements are listed below:

1.1 Housing -

1.1.1 The COLOR shall be Federal YELLOW.

1.1.2 Each Signal Head housing shall consist of an assembly of separate interchangeable sections, each holding an individual optical unit. THE TOP SECTION OF EACH 3-SECTION HEAD SHALL HAVE AN ALUMINUM REINFORCING / BEARING PLATE INSIDE THE HEAD. The Aluminum reinforcing / bearing plate retaining screws shall provide for a watertight seal to prevent water from entering the housing. The TOP SECTION OF THE FIVE-SECTION CLUSTER, AND OF THE FOUR-SECTION IN-LINE, SHALL BE ALUMINUM. The rest of those configurations shall be POLYCARBONATE.

1.1.3 The material of the Housing, Door, and Visor shall be engineering-grade structural, ultraviolet-stabilized PURE POLYCARBONATE resin. Other plastics are NOT acceptable. All edges shall be milled to a uniform round edge and free of all sharp edges.

1.1.4 Polycarbonate. The Department is aware of the design characteristics of this material--particularly the fact that as fillers are added for strength, the material becomes more brittle. We also recognize that signal manufacturers have optimized their designs around a specific formulation. There is also a requirement for an un-filled polycarbonate lens material that is strong, but will not darken (burn) or color fade. Therefore the VENDOR shall provide complete particulars about the polycarbonate type number proposed, for both the HOUSING and for the LENSES. Further the VENDOR shall submit strength and wind tunnel test results (See Paragraph 15.2 and 15.3, Quality Control.)

1.2 Door -

1.2.1 The COLOR shall be Federal YELLOW.

1.2.2 The door latches shall consist of stainless steel latch eye-bolts, wing-nut, and washer; all retained to keep them from falling to the street. No special tools shall be necessary to unlatch and open a door. Doors shall be easily removed; hinge-pin shall not have to be driven out to remove door.

1.2.3 The hinges, shall be reinforced protrusions (mortise and tenon) from the door, with a minimum of one (1) stainless-steel pin and one (1) polycarbonate pin.

1.3 Visor -

1.3.1 The Visor COLOR shall be Federal YELLOW outside, and dull BLACK inside.

1.3.2 The Visor CLASSIFICATION shall be TUNNEL (slot at bottom), unless otherwise specified.

1.3.3 The Visor shall be twist-on, attached to the housing with four (4) stainless steel SCREWS, through the twist-on tabs on the visor.

1.4 Wiring -

1.4.1 Wiring and Electrical shall be in accordance with ITE Standards. Color Coded wiring shall be factory connected to a barrier type TERMINAL BLOCK in the LOWER PORTION OF THE RED SECTION of each Signal Head. In the five-section cluster, the TERMINAL BLOCK shall be located in the (TOP) SECTION.

1.4.2 The TERMINAL BLOCK shall be double sided barrier type with two screws per barrier section; and shall make connections to the lamp wires using fast-on SPRING-LOADED SPADE LUGS and screws, (i.e. provisions should be made so that spade lugs or screws can be used on the same terminal block.) ONE PER SCREW. More than one neutral is allowed per terminal. The number of barrier sections in the TERMINAL BLOCK for the three and four section head, shall be 6-position, 12-terminal. For the five section head, it shall be 8-position, 16-terminal.

1.5 Mounting Assemblies -

1.5.1 All mounting hardware shall be furnished for Span-Wire mounting, as requested by the purchase order. Hardware for Span-Wire shall be finished Federal YELLOW

1.5.2 For Span-Wire mounting, the HANGER shall be cast ALUMINUM, and shall contain two (2) stainless steel J-Hooks with stainless steel lock washers and nuts, and have seven (7) notches to position the hanging signal. A double weatherhead entrance shall be used. The weatherhead entrance BUSHING shall have a 38 mm (1-1/2 inch) hole for wire entry. That entrance diameter shall be maintained throughout the weatherhead, without restriction or reducing the hole diameter, into the signal head. No special tools shall be required to tighten or adjust signal heads. Span wire hangers shall not require disassembly to install on span wire.

1.5.3 For Span-Wire mounting, for MULTI-WAY heads, there shall be included a "SWIVEL BALANCE ADJUSTER" for proper vertical alignment.

1.5.4 For 5-SECTION CLUSTER signal assemblies, ONE Span-Wire Hanger shall be furnished, attached to the top signal section. The configuration shall be FHWA MUTCD TYPE 'S', known as the "dog-house head". At the bottom of the top signal section, a cast-aluminum bracket shall connect with the arrow side, and with the ball indication side. This bracket shall have a removable, threaded "knockout" plug at each 90-degree turn, to facilitate wiring.

A 50 mm (2 inch) wide ribbed, cast aluminum BOTTOM BRACKET (No. 10 018 or equiv.), having holes 430 mm (17 inches) on-center, shall be used to unify the assembly. (The two sides of the cluster shall be not more than 200 mm (8 inches) apart.)

1.5.5 For 4-SECTION "T" ASSEMBLY, ONE Span-Wire Hanger shall be furnished, together with two (2) cast aluminum brackets. The two red sections shall be not more than 200 mm (8 inches) apart.

1.6 Balance Adjuster -

When needed, a Balance adjuster shall be aluminum with a 3/4" WEH. It shall be furnished Federal Yellow and shall have stainless steel bushing, stainless steel hardware, and a stainless steel eye.

2. GENERAL – LED Modules

2.1 All makes and models of LED modules purchased for use on the SCDOT State Highway System shall appear on the current NCDOT Traffic Signal Qualified Products List (QPL).

2.2 Provide modules that consist of an assembly that utilizes LEDs as the light source in lieu of an incandescent lamp for use in traffic signal sections. Use LEDs that are AlInGaP technology for red and yellow indications and InGaN for green indications. Install the ultra bright type LEDs that are rated for 100,000 hours of continuous operation from -40°C to +74°C. Design modules to have a minimum useful life of 60 months, and to meet all parameters of this specification during this period of useful life.

2.3 Ensure, unless otherwise stated in these specifications, that each module meets or exceeds the requirements of the Interim Purchase Specification of the ITE VTCSH part 2 (Light Emitting Diode (LED) Vehicular Traffic Signal Modules (hereafter referred to as VTCSH-2). Arrow displays shall meet or exceed the electrical and environmental operating requirements of VTCSH-2 sections 3 and 5, chromaticity requirements of section 4.2, and the requirements of sections 6.3 (except 6.3.2) and 6.4 (except 6.4.2).

2.4 Each LED module supplied shall be factory installed in vehicle signal head or shipped as a complete kit designed for retrofitting existing traffic signal sections with an LED display module.

2.5 Lamp socket 'Screw-in' type products shall not be allowed for vehicle traffic signals.

3. ELECTRICAL -

3.1 Provide modules that have maximum power consumption equal to or below the requirements of Table 1. Design the modules to operate from a 60 ± 3 HZ AC line voltage ranging from 80 volts to 135 volts. Ensure that fluctuations of line voltage have no visible effect on the luminous intensity of the indications. Design the module to have a normal operating voltage of 120 VAC, and measure all parameters at this voltage.

3.2 Certify that the module has a power factor of 0.90 or greater, and that THD (current and voltage) induced into an AC power line by the module does not exceed 20 percent for modules with power ratings above 15W, and 40 percent for modules with power ratings of 15W or less. Design the modules onboard circuitry to include voltage surge protection to withstand high repetition noise transients as stated in Section 2.1.6 of NEMA Standard TS-2, 1992. Ensure all wiring meets the requirements of Section 13.02 of the ITE Publication: Equipment and Material Standards, Chapter 2 (VTCSH). Provide spade terminals appropriate to the lead wires and sized for a #10 screw connection to the existing terminal block in a standard signal head.

3.3 Ensure that the module is compatible with signal load switches and conflict monitors. Design the module to provide sufficient current draw to ensure proper load switch operation while the voltage is varied from a regulated 80Vrms to 135 Vrms. Design off-state for green and yellow modules to be 30Vrms or greater, and on-state to be 40Vrms or greater. Also for green and yellow modules, design the voltage decay to 10 Vrms or less to be 100 milliseconds or less. Ensure that the control circuitry prevents current flow through the LEDs in the off state to avoid a false indication.

3.4 Design all modules to meet existing SCDOT monitor specifications for the following type of signal monitors: 170 controller/cabinet Type 210, 2010 and 2010ECL conflict monitors (including red monitoring and so-called plus features such as dual indication detection and short yellow time detection).

3.5 Ensure that the modules and associated onboard circuitry meet Class A emission limits referred to in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.

4. Photometric and Chromaticity Requirements -

4.1 The maintained minimum luminous intensity values for the modules are shown in Tables 2, and 4. Test all ball modules for luminous intensity at 25°C to meet 115% of values in table 2. Design and certify the modules to meet or exceed the maintained minimum luminous intensity values throughout the warranty period based on normal use in a traffic signal operation over the operating temperature range. Test the Red and Green modules for maintained luminous intensity (tables 2 & 3) at 74°C (ITE 6.4.2.2). Use LEDs that conform to the chromaticity requirements of VTCSH Chapter 2, Section 8.04 throughout the warranty period over the operating temperature range. Make chromaticity coordinate compliance measurements at 25°C.

5. Physical and Mechanical Requirements -

5.1 Design the modules as retrofit replacements for installation into standard incandescent traffic sections that do not contain the incandescent lens, reflector assembly, lamp socket and lens gasket. Ensure that installation does not require special tools or physical modification for the existing fixture other than the removal of the incandescent lens, reflector assembly, lamp socket, and lens gasket.

6. Environmental Requirements -

6.1 Provide modules that are rated for use in the operating temperature range of -40°C (-40°F) to +74°C (+165°F). Ensure that the modules (except yellow) meet all specifications throughout this range. Fabricate the module to protect the onboard circuitry against dust and moisture intrusion per the requirements of NEMA Standard 250-1991 for Type 4 enclosures to protect all internal components.

7. Module Construction -

7.1 Design the module to be a single, self-contained device with the circuit board and power supply for the module inside and integral to the unit.

7.2 Design the assembly and manufacturing process for the module to ensure all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources. Wire the individual LEDs such that a catastrophic loss or the failure of one LED will result in the loss of not more than 20 percent of the signal module light output. LEDs shall be soldered to the circuit board.

8. Materials -

8.1 Fabricate the lens and signal module from material that conforms to ASTM specifications.

Enclosures containing either the power supply or electronic components of the module shall be made of UL94VO flame retardant materials. The lens of the signal module is excluded from this requirement.

9. Module Identification -

9.1 Permanently mark the manufacturer's name, trademark, model number, serial number, date of manufacture (month & year), and lot number as identification on the back of the module.

9.2 Permanently mark the following operating characteristics on the back of the module: rated voltage and rated power in Watts and Volt-Ampere.

9.3 If a specific mounting orientation is required, provide permanent markings consisting of an up arrow, or the word "UP" or "TOP" for correct indexing and orientation within the signal housing.

10. Lens -

10.1 Provide a lens that is integral to the unit with a smooth outer surface and UV stabilized to withstand ultraviolet exposure for a minimum period of 60 months without exhibiting evidence of deterioration. Coat the front of a polycarbonate lens to make it more abrasion resistant. Seal the lens to the module to prevent moisture and dust from entering the module.

Tint the red and yellow lens to match the wavelength (chromaticity) of the LED. Provide a green lens that is either colorless or tinted to match the wavelength (chromaticity) of the LED.

11. 12 Inch (300 mm) Arrow -

11.1 The following specification requirements apply to the 12 inch (300 mm) arrow module only, which is the only size arrow allowed. All general specifications apply unless specifically superseded in this paragraph. Ensure that the arrow module meets specifications stated in Section 9.01 of the ITE VTCSH for arrow indications. Design arrow displays to be solid LEDs

(spread evenly across the illuminated portion of the arrow or other designs) not outlines. Determine the luminous intensity using the CALTRANS 606 method or similar procedure.

12. **Testing** -

12.1 Provide test results for ball modules from an independent testing laboratory showing wattage and compliance with ITE VTCSH Part 2 specifications 6.4.2, 6.4.4.1, 6.4.4.2, 6.4.4.3, 6.4.5, and 6.4.6.1 as a minimum. The 6.4.2.1 test shall meet the requirements of Table 2 of this specification. The 6.4.2.2 test is for Red and Green only. Ensure that the LED signal modules tested are typical, average production units.

12.2 **Burn In** - Energize the sample module(s) (a sample of one module minimum) for a minimum of 24 hours, at 100 percent on-time duty cycle, at a temperature of +74°C (+165°F) before performing any qualification testing. Any failure of the module, which renders the unit non-compliant with the specification after burn-in, shall be cause for rejection. All specifications will be measured including, but not limited to:

12.2.1 **Photometric (Rated Initial Luminous Intensity)** - Measure at +25°C. Measure luminous intensity for red and green modules upon the completion of a 30 minute 100 percent on-time duty cycle at the rated voltage. Measure luminous intensity for yellow modules immediately upon energizing at the rated voltage.

12.2.2 **Chromaticity (Color)** - Measure at +25°C. Measure chromaticity for red and green modules upon the completion of a 30 minute 100 percent on-time duty cycle at the rated voltage. Measure chromaticity for yellow modules immediately upon energizing at the rated voltage.

12.2.3 **Electrical** - Measure all specified parameters for quality comparison of production quality assurance on production modules. (rated power, etc)

12.3 **Equipment Compatibility** - In addition to the 6.4.4.5 test of modules for compatibility with controllers, conflict monitors, and load switches, perform the following test, and certify the results. Connect each signal module to the output of a standard load switch connected to a variable AC voltage supply (95 to 135 VAC). With the load switch “off,” vary the AC voltage from 95 Vrms to 135 Vrms, and measure the drop across the module. Readings greater than 15 Vrms are unacceptable.

13. **Photometric Maintenance** -

13.1 Provide testing at an independent laboratory for a designated module to be tested for maintained luminous intensity at 25°C once each year during the five-year warranty period.

14. TABLES –

Table 1 Maximum Power Consumption (in Watts)

	Red	Yellow	Green
Temperature	25°C	25°C	25°C
12”(300 mm) circular	17	25	24
12”(300 mm) arrow	9	10	11

Table 2 Specification for 12 inch (300 mm) Extended View Signals in South Carolina

Minimum Luminous Intensity Values (In Candelas)				
Expanded View Vertical Angle	Horizontal Angle (Left/Right)	RED	YELLOW	GREEN
+/-2.5	2.5	339	678	678
	7.5	251	501	501
	12.5	141	283	283
	17.5	77	154	154
+/-7.5	2.5	226	452	452
	7.5	202	404	404
	12.5	145	291	291
	17.5	89	178	178
	22.5	38	77	77
	27.5	16	32	32
+/-12.5	2.5	50	101	101
	7.5	48	97	97
	12.5	44	89	89
	17.5	34	69	69
	22.5	22	44	44
	27.5	16	32	32
+/-17.5	2.5	22	44	44
	7.5	22	44	44
	12.5	22	44	44
	17.5	22	44	44
	(Not Extended View) 22.5	20	41	41
	(Not Extended	16	32	32

Minimum Luminous Intensity Values (In Candelas)				
	View) 27.5			
+/-22.5	2.5	20	40	40
	17.5	20	40	40

Notes:

Design signal modules to meet these requirements as a minimum throughout the warranty period. Design signal modules to have a minimum initial intensity equal to 115% of Table 2 at 25°C. Independent laboratory test reports are required to validate the initial intensity.

Table 3 Minimum Initial and maintained Intensities for Arrow Indications (in cd/m2)

	Red	Yellow	Green
Arrow Indication	5,500	11,000	11,000

Note: Use CALTRANS 606 method or similar procedure.

Table 4 Chromaticity Standards (CIE Chart)

Red	Y: not greater than 0.308, or less than 0.998 - x
Yellow	Y: not less than 0.411, nor less than 0.995 - x, nor less than 0.452
Green	Y: Not less than 0.506 - 0.519x, nor less than 0.150 + 1.068x, nor more than 0.730 - x

15. CERTIFICATION AND QUALITY CONTROL -

15.1 The **CONTRACTOR SHALL PROVIDE** written Certification from the Manufacturer that ITE STANDARDS have been met.

15.2 The **CONTRACTOR SHALL PROVIDE** design details and drawings in sufficient detail for complete evaluation and comparison with these Specifications. Any exceptions to these Specifications must be stated in writing at that time.

NOTE: CATALOG CUTS REQUIRED

15.3 The **CONTRACTOR SHALL PROVIDE** written TEST RESULTS DEMONSTRATING THE STRENGTH OF THE 3-SECTION SIGNAL HEAD. The test signal shall not have the SCDOT aluminum bearing plate installed. The tests should include static stress and wind tunnel setups

15.4 Sample modules shall be provided for Department approval upon request. The sample modules submitted shall be representative of typical average production units. Samples will not be returned unless requested by the vendor.

16. WARRANTY -

16.1 The CONTRACTOR shall furnish the Engineer with any warranties on equipment, materials, modules and lamps that are provided by the Manufacturer or Vendor as normal trade practice.

17. CONSTRUCTION METHODS -**17.1 Location -**

17.1.1 Polycarbonate vehicle signal heads shall be installed where shown on the plans, positioned according to the design details or the standards or at other locations as directed by the Engineer.

17.1.2 The top section of all vehicle signal heads mounted on the same pole or pedestal shall be within 150 mm (6 inches) of being the same height unless otherwise specified.

17.1.3 All multi-section/ combination signal heads shall be arranged with their top sections at the same elevation as other signal heads.

17.2 Clearance -

17.2.1 Signal heads placed over the roadway shall be installed to provide a road clearance of 5.2 to 5.8 meters (17 to 19 feet). This distance shall be measured from the pavement to the lowest part of the assembly.

17.3 Wiring -

17.3.1 Electrical cable shall be connected to the terminals in each signal head to provide the proper display indication.

17.3.2 External splicing of cable shall not be permitted.

17.3.3 Electrical cable runs shall be as indicated in the specifications and on the plans.

17.4 Mounting -

All traffic signal heads shall be mounted as shown on the design details or on the standard.

18. SIGNAL AIMING -

18.1 Signal faces to be aimed to insure good visibility, and to the satisfaction of the Engineer. The following guidelines are to be followed:

Rural Areas - aimed at 1000'

Suburban Areas - aimed at 500'

Urban Areas - aimed at 300'

In no instance is the signal face to be visible for a distance less than provided in the MUTCD table of Visibility Distance.

19. **METHOD OF MEASUREMENT** -

19.1 The furnishing and installing of Polycarbonate Vehicle Signal Heads shall be measured by EACH type of head assembly specified, including ALL internal electrical connections and ALL required incidental hardware and the LED modules.

20. **BASIS OF PAYMENT** -

20.1 Furnishing and installing of Polycarbonate Vehicle Signal Heads with 'RED', 'YELLOW', and 'GREEN' LED Modules, measured as provided above, will be paid for at the contract unit price for:

FURNISH AND INSTALL:

12 INCH (300 MM) _-WAY _-SECTION (*LENS-DESCRIPTION)

VEHICLE TRAFFIC SIGNAL WITH LED VEHICLE SIGNAL MODULES –

EACH

and such payment shall be full compensation for furnishing and installing the specified equipment, materials, and incidentals to complete this item.

20.2 Typical *LED-Descriptions

1-W 3-S	R-LED.Y-LED.G-LED
1-W 3-S	R-LED.YA-LED.GA-LED (Left)
1-W 4-S	R-LED+R-LED.YA-LED.GA-LED (Left)
1-W 4-S	R-LED.Y-LED.G-LED.GA-LED (Left)
1-W 5-S	R-LED.YA-LED.GA-LED.Y-LED.G-LED (Left)
1-W 5-S	R-LED.YA-LED.GA-LED.Y-LED.G-LED (Right)
1-W 1-S	R-LED
1-W 1-S	Y-LED
1-W 1-S	G-LED

REMOVAL SALVAGE AND DISPOSAL OF EQUIPMENT AND MATERIALS

DESCRIPTION - This item consists of the Removal and Salvage, or the Removal and Disposal of equipment and materials, during the construction of this project. Construction includes new installations, and the modification, or removal of existing traffic signals. When the Project is within city limits, the local SC DOT District Shop shall be given first right of refusal. If the

equipment is declined, it shall next be offered to the City. If also declined, it shall be Disposed of, as stated below.

1. GENERAL -

1.1 Removal and Salvage -

These items are to be carefully removed from the job site, salvaged, and returned to the Department. The items of major equipment to be salvaged are listed on the Plans. The Contractor shall deliver, (and obtain a RECEIPT for), the salvaged equipment, to:

**** SC DOT DISTRICT ELECTRICAL/SIGNAL SHOP ****

District 1: 1400 Shop Road, P.O. Box 191, Columbia, SC 29202

(803)-737-6646

District 2: P.O. Box 820, Greenwood, SC 29648

(864)-227-6701

District 3: 13 Saluda Dam Road, Greenville, SC 29611

(864)-241-1117

District 4: 300 Armory Road, P.O. Box 386, Chester, SC 29706

(803)-581-8551

District 5: RT 76/301 E., Palmetto Street, Florence, SC 29503

(843)-661-4733

District 6: 6355 Fain Street, North Charleston, SC 29418

(843)-740-1668

District 7: P.O. Box 1086, Orangeburg, SC 29115

(803)-531-6870

1.2 Disposal -

Material NOT to be salvaged, shall be removed from the job site, become the property of the Contractor; and should be properly disposed by the Contractor, at an APPROVED LAND FILL (or material reclamation yard). Any materials designated as HAZARDOUS WASTE shall be disposed in accordance with regulations enforced by the SC Department of Health and Environmental Control (DHEC), Bureau of Solid and HAZARDOUS Waste; (803)-734-5000 for information.

1.3 Inspection -

Removal and disposal quantities will not be measured as pay items, but shall be included in the price bid for Removal, Salvage, and Disposal. FINAL ACCEPTANCE and Final Payment will be withheld, if the Contractor has not removed unneeded equipment from the job site, and if the Contractor cannot present RECEIPTS from the Shop showing that the salvaged equipment has been delivered to the Department as specified.

1.4 Holes -

Every hole caused by removing old equipment shall be filled THE SAME DAY. It shall be back-filled, compacted, and reseeded/sodded, to the satisfaction of the Engineer. Holes in PAVEMENT shall be cleanly side-trimmed, then brought to grade and finished with the same

paving material as the adjacent pavement. Sidewalk "squares" shall be completely replaced (complete square), using forms and expansion material.

2. SPECIFIC ITEMS -

2.1 Controllers and Cabinets -

Prior to removal, every cabinet, controller, coordination unit, conflict monitor, detector amplifier, and other major equipment item shall be clearly tagged with the intersection name from which it is being removed. Then, each piece of equipment shall be carefully removed from the cabinet and boxed. The pins and threaded portion of the connectors, shall be protected with plastic covers, or the harnesses left in place to prevent damage. The cabinet with all other related equipment (clocks, flashers, load switches, etc.) may then be removed and transported intact. The foundations of ground mounted cabinets shall be removed completely, or cleared to 0.3 metres (1 ft.) below ground.

2.2 Signal Heads -

Vehicle and pedestrian traffic signal heads to be removed and salvaged shall be carefully dismounted, keeping as much of the hardware intact as possible. During the removal and delivery, special care should be taken to prevent damage to the lenses and visors.

2.3 Metal Poles -

This includes the removal and salvage of strain poles, pedestal poles, and their related hardware (pole caps, bolt covers, handhole covers, nuts, transformer bases, etc.). The pole foundations shall be removed completely, or cleared to 0.3 metres (1 ft.) below ground.

Where shown on the Plans, some pole or cabinet foundations may be designated for complete removal (road widening, etc.). In these cases the concrete base shall be loosened, pulled out of the hole, and disposed.

2.4 Wood Poles -

Wood Poles that are not utilized in the new signalization, and are not required by other utilities, shall be removed. The Engineer shall make the determination whether each wooden pole shall be salvaged or disposed. Back guys, grounding systems, and miscellaneous hardware shall be disposed.

2.5 Pressure Sensitive Detectors -

This includes the removal and disposal of pressure sensitive detector pads and frames. The removal of the adjacent paving and the subsequent back-filling shall be performed as described in the "Trenching and Backfilling" section of FURNISH AND INSTALL ELECTRICAL CONDUIT. Furnishing all materials, providing steel plates during curing, as well as the labor and equipment costs are to be included in the bid price for Removal, Salvage, and Disposal. The removed pressure pad, etc. shall be discarded.

2.6 Miscellaneous Equipment -

Minor equipment shall be removed from the site and discarded. This includes steel cable, electrical cable, conduit, pedestrian buttons and signs, concrete pads, and spliceboxes/pullboxes/handboxes not utilized in the new signalization. Underground conduit and detector loops not utilized, shall be abandoned in place.

2.7 Signs -

Highway signs on existing span wires, shall be removed and salvaged, immediately after the replacement signs have been installed.

3. **METHOD OF MEASUREMENT** -

The Removal, Salvage, and Disposal of traffic signal materials and related equipment, will not be measured, but shall be paid as a Lump Sum item covering all intersections named in the Contract. The related costs of transportation, disposal, concrete, pavement repair, etc., will not be measured for payment, but shall be included in the bid price of Removal, Salvage, and Disposal.

4. **BASIS OF PAYMENT** -

The Removal, Salvage, and Disposal of equipment and materials, shall be paid at the Contract price bid for--

REMOVAL, SALVAGE, AND DISPOSAL OF EXISTING TRAFFIC SIGNAL EQUIPMENT--
LUMP SUM

which shall be full compensation for the removal, salvage, and disposal, with transportation, and for all labor, equipment, materials and incidentals to perform the work as specified.

FURNISH SYSTEM INTEGRATION AND TESTING

DESCRIPTION - This work consists of providing the personnel, equipment and technical support to test the traffic signal equipment prior to installation on the street; and to connect all equipment; to program operating parameters; and to make the traffic signal system totally operational.

1. **GENERAL** -

1.1 Personnel - THIS IS A "TURN-KEY" PROJECT, WITH THE CONTRACTOR PERFORMING -ALL- ACTIVITIES. The CONTRACTOR shall be capable of performing, or shall obtain the services of a MANUFACTURER'S TECHNICAL REPRESENTATIVE, (or other technically trained persons) to accomplish all items in this Specification. Department personnel will NOT perform this service for the Contractor.

1.2 License - Being a third party, it is the responsibility of the CONTRACTOR TO SECURE THE SOFTWARE LICENSE to permit legitimate Contractor use of the firmware and software used by the system. This LICENSE may be written to include training for Contractor personnel.

2. SYSTEM INTEGRATION -

2.1 Installation, Assembly, and Connection -

The CONTRACTOR or MANUFACTURER'S TECHNICAL REPRESENTATIVE, shall provide complete Closed Loop SYSTEM INTEGRATION. This shall include connecting all signal equipment and making it totally operational. This shall also include verification of communication and closed loop operation from the Central Monitoring Facility computer. Where the computer is being provided by the signal system project, this shall include assembly and connection of the computer and peripheral equipment.

2.2 Programming -The CONTRACTOR or MANUFACTURER'S TECHNICAL REPRESENTATIVE shall program the central computer, controllers and master(s) with their associated operating/timing parameters. The initial timing values will be provided as design requires. This work shall include the primary programming of "traffic responsive" parameters, where applicable. These persons shall create and furnish the customized COLOR GRAPHICS DISPLAYS required by the system. This shall include an intersection DRAWING/GRAPHIC for each signal and creating system display(s) for the signals controlled by each separate field master.

3. SYSTEM TESTING -

The CONTRACTOR or MANUFACTURER'S TECHNICAL REPRESENTATIVE shall provide pre-installation cabinet and controller TESTING in accordance with these requirements. The tests shall provide full hookup electrical testing and communication verification. The test period shall extend uninterrupted for (7) seven days for a signal system and (3) three days for an isolated signal or group of signals that will **NOT** be interconnected in any way. These tests shall be conducted in a climate controlled (indoor /heat /AC) TEST BUILDING, that is provided by the CONTRACTOR. The Building shall be complete with desk, chairs, two telephone lines, 120 VAC outlets, overhead lighting, a rest room, and at a convenient location to be approved by the Department. The TEST BUILDING shall be open to the Department, the Municipality, or the Federal Highway Administration and the test shall be witnessed by the Department. This shall also include storage until the equipment is needed on the street. The certified equipment shall then be transported to work site by the CONTRACTOR.

4. BASIS OF PAYMENT -

All costs associated with these programming, testing, and systems integration activities, and with securing the software License, making the entire system complete and operational to the satisfaction of the Engineer shall be paid at the Contract Unit Price bid for--

INTEGRATION -- LUMP SUM

Which shall be paid on a prorated LUMP SUM basis, being:

-Twenty five (25%) percent with the first monthly estimate;

-Fifty (50%) percent when the contract dollar amount reaches fifty percent of the total contract; and the final

-Twenty five (25%) percent following successful FINAL INSPECTION and conditional acceptance of the traffic signal project, (or of the traffic signal equipment alone, when it is part of a road project).

FURNISH TRAFFIC SIGNAL SYSTEM TRAINING

1. GENERAL REQUIREMENTS -

The **CONTRACTOR** shall provide complete training for **DEPARTMENT** and maintaining agency personnel and representatives in the operation and maintenance of the traffic signal system components. The training program shall consist of formal classroom lectures and "hands-on" workshops with central and field equipment. The **CONTRACTOR** shall provide all personnel and instructors necessary for providing all training. Where appropriate, the instructors shall be employees of the manufacturer(s) of the traffic signal system components.

All training classes must be completed prior to the beginning of any system/intersection operational testing. Training classes shall not overlap without prior approval of the Resident Construction Engineer. Training class schedules shall be consistent with the working schedules of the class attendees. Training shall only be scheduled on weekdays; and training days shall generally consist of six (6) to eight (8) hours.

The **CONTRACTOR** shall develop and provide all necessary training materials, aids, and manuals.

The **CONTRACTOR** shall provide training and training materials for up to 15 people in each training class. The Resident Construction Engineer shall provide a listing of the expected trainees for each training session, when the proposed training materials are approved.

As part of the **CONTRACT** materials submission requirements, the **CONTRACTOR** shall submit for approval copies of all training program subjects, training materials, aids, manuals, class agendas, class schedules (includes dates and times) and training locations. All submission materials must be approved by the Resident Construction Engineer before permission to begin training is given.

2. TRAINING PROGRAM SUBJECTS -

The **CONTRACTOR** shall, as a minimum, provide training on the subjects listed below. The **CONTRACTOR** shall address the theory of operation and the technical and practical aspects of each component. Specific and thorough attention should be afforded to day-to-day operation, programming, testing, fault-diagnosis and repair of each component. Training related to specific hardware components shall include hands-on demonstrations utilizing sample components identical to those components installed in the field. Training on the proper use of specific tools utilized during installation, testing, and maintenance of various system components shall be

addressed. Training classes on the following subjects shall be provided. Minimum required class durations are given in parentheses.

2.1 Local Intersection Controller Assemblies -

This subject shall include all pertinent information required for the programming, operation and maintenance of the local intersection controller assemblies. This information shall include diagnostic and repair procedures. This information shall include but shall not be limited to: local intersection controller; conflict monitor; controller cabinet assembly; and, intersection loop detectors. Manual and computer field programming shall be addressed. The **CONTRACTOR** may expect that class attendees will have basic, general knowledge of traffic controller equipment. (8 hours)

2.2 Internal Local Coordinator -

Local -To- On-Street Master Communications.

On-Street Master Assemblies.

On-Street Master -To- Central System Communications.

This subject shall include all pertinent information required for the programming, operation, and maintenance of the on-street traffic signal system components. This information shall include diagnostic and repair procedures. This information shall include but shall not be limited to: internal local coordination unit; on-street master controller unit; and all communication systems and communication hardware including local telemetry units, any radio components, and on-street auto-dial/auto-answer external communications modems. Manual and computer field programming shall be addressed. The **CONTRACTOR** shall expect that class attendees will have no previous experience of knowledge regarding this subject. (16 hours)

2.3 Central Control Center Equipment -

This subject shall include all pertinent information required for the operation and maintenance of the Central Control Center Equipment. This information shall include basic operation of the central microcomputer assembly, monitor, printer, and auto-dial/auto answer external communications modem equipment including various diagnostic/trouble-shooting tools available to the computer user. The **CONTRACTOR** shall expect that class attendees will have a basic familiarity with MS-DOS personal computer systems, but no other specific experience or knowledge regarding this subject. (4 hours)

2.4 Traffic Signal System Central Software And Operation -

This subject shall include all pertinent information required for the operation of the traffic signal system and the development of the traffic signal system database. The pertinent information shall include all aspects of operation of the central software programs. This information shall also include complete and thorough training on the system database and the necessary information to be input into the on-street equipment to give the desired on-street operation. This information shall include all local controller programming and operation as it impacts the operation of the local controllers within the system. This information shall include all programming of the local intersection coordination parameters and on-street master controller units for all modes of coordinated system operation. This information shall include all specific system database structure and parameters and the inter-relations between different types of system data. The

CONTRACTOR shall expect that class attendees will have basic experience and knowledge of local intersection and coordination system timing and operation but shall not expect specific familiarity with the products of the system of the manufacturer being installed. (16 hours)

3. ACCEPTANCE OF TRAINING -

Within 7 calendar days of the completion of each training class, the Resident Construction Engineer shall provide acceptance or non-acceptance of the training program. If the training program is not accepted, the **CONTRACTOR** shall correct the deficiencies in the training program and provide again the necessary class(es) at his expense. Acceptance of system training of each training program subject will be based on the following criteria:

- (a) Thoroughness and completeness of instructional coverage of the training program subject;
- (b) Thoroughness and appropriateness of the training program subject materials, including class demonstration and audio/visual aids, to the instructional coverage; and,
- (c) Class instructor's ability to answer class attendees and clarify training material to the satisfaction of the class attendees.

The DEPARTMENT reserves the right to halt an ongoing class, if that class will clearly not be accepted.

For all training classes that are not acceptable, the Resident Construction Engineer shall provide specific information on which specific training classes are not acceptable and why within 7 calendar days of the completion of each training class. Within 15 calendar days of notification of non-acceptance of the training program, the **CONTRACTOR** shall submit for approval revised training program materials that correct the deficiencies in the non-accepted training classes. These materials shall clearly demonstrate the **CONTRACTOR's** revisions to the training program and shall include a new training program schedule. All of the **CONTRACTOR's** requirements and responsibilities for the original training program shall be borne by the **CONTRACTOR**. Once the revised training program is approved, the **CONTRACTOR** shall again provide the training classes for the original class attendees or specific substitutes for original attendees. The **CONTRACTOR** is only responsible for providing subsequent training classes for those classes that were not accepted as part of the original training program.

4. PAYMENT FOR TRAINING -

Training shall be paid for at the Contract price bid for the item established for:

TRAINING -- LUMP SUM

to be paid at the conclusion of the training, which shall be full compensation for the provision of signal system training, including all materials and incidentals to perform the work as specified.

INSTALL DEPARTMENT SUPPLIED EQUIPMENT

DESCRIPTION - This work shall consist of installing equipment that will be supplied by the department, at the locations designated on the Plans, in accordance with the appropriate Specification, and the applicable Design Detail or Standard.

1. MATERIALS -

The Plans and BID or Proposal Forms, state specifically which material will be supplied by the Department. ALL OTHER MATERIALS SHALL BE ASSUMED TO BE FURNISHED BY THE CONTRACTOR. The Contractor should refer to the appropriate “Furnish and Install ...” Specification to determine what other materials will be required to complete the installation. Those materials must be required to complete the installation. Those materials must then meet the physical Specifications stated. The Contractor shall also supply all miscellaneous materials that will result in a complete and acceptable project.

2. CERTIFICATION -

The Contractor shall provide certification that any material they supply for this item will meet the Specifications.

3. GUARANTEE -

For any materials they supply, the Contractor shall furnish the Department with all warranties offered by the manufacturer as normal trade practice.

4. CONSTRUCTION METHODS -

4.1 General - All workmanship and construction methods shall be in accordance with the appropriate Specification and in agreement with the applicable Design Detail or Standards.

4.2 Example - As an example, take the BID item – “INSTALL CONTROLLER BASE-MOUNTED CABINET-- EACH”. The Contractor shall then refer to the Specification titled “FURNISH AND INSTALL CONTROLLERS AND CABINET”. They shall then furnish any other necessary materials, and shall complete the work needed to result in a finished installation. The Contractor shall also refer to the Plans, and to the Design Details and Standards.

5. METHOD OF MEASUREMENT -

Installation of Department supplied equipment will be measured by SPECIFIED UNITS installed/erected in place as shown on the plans, including miscellaneous materials, fully operable. The Contractor is responsible for picking up the equipment to be supplied, at the appropriate DOT Depot or Shop, and for providing any loading equipment and trailers required. The Specified Units shall be that stated in the “Furnish and Install...” specification.

6. BASIS OF PAYMENT -

Installed Department supplied equipment, accepted and measured as provided above, will be paid for at the contract unit price bid for:

INSTALL – (Equipment Description) – SPECIFIED UNITS

which shall be full compensation for all work and miscellaneous materials necessary to complete the work item specified. Such payment includes the cost of transportation, loading, and unloading, by the Contractor.

APPENDIX A

PLANS

Appendix A (the Plans) to this Scope of Work is intentionally not attached hereto but is, because of its oversize, provided separately herewith. Appendix A is, nevertheless, part and parcel of this Scope of Work and is incorporated herein by reference.

APPENDIX B

PERMITS



C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment.

January 29, 2009

MACK CANTERBURY
CHARLESTON COUNTY
4045 BRIDGE VIEW DR
NORTH CHARLESTON SC 29405-7464

Re: SC ROUTE 61 & ROAD S-1373 INTERSECTION IMPROVEMENTS
CHARLESTON County
Autocoverage - 65499
Stormwater Less Than/Equal To 0.5 Acre Within 0.5 mile

Dear MACK CANTERBURY:

The submittal package indicates that the above referenced project is within one half mile of a receiving waterbody and is 0.2 acres in size. The Office of Ocean and Coastal Resource Management (OCRM) has reviewed the scope of the submittal and has determined this project is consistent with the S.C. Coastal Zone Management Plan. This project is automatically granted coverage under the NPDES General Permit for Stormwater Discharges From Large and Small Construction Activities effective September 1, 2006 per Part 2 of the permit.

Notification to OCRM is required per S.C. Stormwater Management and Sediment Reduction Regulations (26 S.C. Code Ann. Regs. 72-300, et seq. (Supp. 2006)). Your submittal package, dated January 29, 2009, meets the requirements set forth in **R. 72-305(B)(1) and 72-307(H) from the State Standards for Stormwater Management and Sediment Reduction**. Any impacts to Critical Areas as determined by SCDHEC-OCRM, and/or freshwater wetlands, as determined by the U. S. Army Corps of Engineers must be authorized by the appropriate agency.

If any other state or federal permits are required, a Coastal Zone Consistency Certification from OCRM will be required at that time. This letter does not alleviate your responsibility to obtain other required local, state or federal approvals.

Sincerely,

CHRISTINE KOCZERA

Regulatory Programs Division

cc: Edward Owens, Jr. – Florence & Hutcheson, Inc.
Fowler DelPorto – City of Charleston MS4
SCDOT – MS4

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Ocean and Coastal Resource Management

Charleston Office · 1362 McMillan Avenue, Suite 400 · Charleston, SC 29405

Phone: 843-953-0200 · Fax: 843-953-0201 · www.scdhec.gov



C. Earl Hunter, Commissioner

Promoting and protecting the health of the public and the environment

The following procedures are in effect beginning July 1, 2006, pursuant to 2006 Act No. 387:

1. This decision of the S.C. Department of Health and Environmental Control (Department) becomes the final agency decision 15 days after notice of the decision has been mailed to the applicant or respondent, unless a written request for final review is filed with the Department by the applicant, permittee, licensee, or affected person.
2. An applicant, permittee, licensee, or affected person who wishes to appeal this decision must file a written request for final review with the Clerk of the Board at the following address or by facsimile at 803-898-3393.

Clerk of the Board
SC DHEC
2600 Bull Street
Columbia, SC 29201

3. The request for final review should include the following:
 - a. the grounds on which the Department's decision is challenged and the specific changes sought in the decision
 - b. a statement of any significant issues or factors the Board should consider in deciding how to handle the matter
 - c. a copy of the Department's decision or action under review
4. In order to be timely, a request for final review must be received by the Clerk of the Board within 15 days after notice of the decision has been mailed to the applicant or respondent. If the 15th day occurs on a weekend or State holiday, the request is due to be received by the Clerk of the Board on the next working day. The request for final review must be received by the Clerk of the Board by 5:00 p.m. on the date it is due.
5. If a timely request for final review is filed with the Clerk of the Board, the Clerk will provide additional information regarding procedures.
6. The Board of Health and Environmental Control has 60 days from the date of receipt of a request for final review to conduct a final review conference. The conference may be conducted by the Board, its designee, or a committee of three members of the Board appointed by the chair.
7. If a final review conference is not conducted within 60 days, the Department decision becomes the final agency decision, and a party may request a contested case hearing before the Administrative Law Court within 30 days after the deadline for the final review conference.

The above information is provided as a courtesy; parties are responsible for complying with all applicable legal requirements.

October 31, 2006

ATTACHMENT C

SAMPLE CONTRACT

STATE OF SOUTH CAROLINA)
)
 COUNTY OF CHARLESTON)

CONTRACT
No. 4376
SC 61 at Tobias Gadson

THIS CONTRACT ("Contract") entered into this ____ day of (Month) 2009 between **Charleston County**, South Carolina, a body politic and corporate under the laws of the State of South Carolina, (hereinafter "County") and **(NAME OF COMPANY/INDIVIDUAL)**, a (State Name) Sole Proprietorship/Partnership/Corporation (choose one), the address of which is Street, City, State, Zip (hereinafter "Contractor"); ("Party" as to each; collectively the "Parties").

W I T N E S S E T H:

WHEREAS, the County has sought to contract with an independent contractor for furnishing all labor, supervision, materials and equipment required to perform work that includes traffic control, asphalt surfacing, sub-grade preparation, storm drainage improvements, traffic signal modification, pavement marking, roadway signing, the installation of concrete curb and gutter, sidewalks and driveways.
 ("Work"), and

WHEREAS, the County solicited bids pursuant to IFB No. 4376-10L for the aforesaid Work that is needed; and

WHEREAS, Contractor has represented to the County that its staff is qualified to provide the Work required in this Contract in a professional and timely manner; and

WHEREAS, the County has relied upon the above representations by Contractor; and

WHEREAS, County's Public Works Director has recommended that an Contract for aforesaid roadwork be entered into with Contractor; and

WHEREAS, Contractor desires to provide the aforesaid services pursuant to the terms and conditions contained below,

NOW, THEREFORE, in consideration of these premises and of the mutual covenants herein set forth, it is agreed by and between the Parties hereto as follows:

SECTION ONE
Definitions

Unless the context clearly requires otherwise, all capitalized terms used in this Contract shall have the meanings set forth in this Section One.

"Commencement Date" means the date specified in the Notice to Proceed as the date on which the Contractor shall begin providing the work.

"Contract Documents" means all exhibits, attachments, specifications, and any addenda to this Contract which are incorporated by reference into this Contract and which are marked as follows:

Exhibit A:	Invitation for Bids (IFB) No. 4376-10L
Exhibit B -	Scope of Work (with Appendices)
Exhibit C:	Contractor's Insurance Certificate(s) and Endorsement(s)

Exhibit D: Drug-free Workplace Certification Form
 Exhibit E - Contractor's Bid dated _____, 2009

In the event of any conflict, discrepancy, or inconsistency among any of the documents which make up this Contract, the following shall control:

- a. As between the Contract and the Contract Documents and any other document to include, but not limited to the plans or specifications, the Contract shall govern.
- b. In the event of any conflict, discrepancy, or inconsistency among any of the other Contract Documents, the Contractor shall notify the County immediately upon discovery of same, and the County will notify the Contractor of the resolution.
- c. Any documents not included or expressly contemplated in this Contract do not, and shall not, form a part of this Contract. The Contract Documents are intended to be complementary, and a requirement in one document shall be deemed a requirement in all documents.

As provided in Exhibit B, Scope of Work (with Appendices), attached hereto, certain publications shall also govern the Work hereunder, unless otherwise provided herein, and are also hereby incorporated by reference.

“Contract Price” The price listed in the Contract for service to be received in return.

“Contractor” has the meaning assigned above to that term, and includes that company’s agents, employees, and representatives.

“Contract Quantities” Estimated quantities listed on the bid form.

"County" means County of Charleston, a body politic and corporate under the laws of the State of South Carolina.

“Department” means the South Carolina Department of Transportation also shown herein as “SCDOT”

“Engineer” means the Project Engineer for the County, acting directly or through its duly designated representative, such representative acting within the scope of particular duties assigned to it or of the authority given it. For purposes of this Contract and the Work to be performed under it, the duly designated representative of the Engineer shall be the Project Manager (as defined below).

“Final Payment” means as the last payment from the County to the successful Bidder of the entire unpaid balance of the Contract sum as adjusted by any approved change orders.

“Notice to Proceed” means the written notice to be given by the County to the Contractor to commence Work under this Contract.

“Procurement Director” means the Contracts and Procurement Director for Charleston County.

“Project” means the “Work” and is used interchangeably with that term.

“Project Manager” shall be the field engineer designated by the County to serve as project manager for the Work.

“Project Site” means the site or sites where the Work is performed. This term is used interchangeably with "Work Site".

“Work” means the work specified and described in Exhibit B (“Scope of Work (with Appendices)”) to this Contract and includes, but is not limited to, materials, workmanship, manufacture and fabrication of components.

“Work Site” means the “Project Site” and is used interchangeably with that term.

SECTION TWO

Term

Contractor shall complete the work within ninety (90) calendar days after the County issues a Notice to Proceed, absent any extensions as provided for herein. Contractor shall not commence work prior to the issuance of a Notice to Proceed.

SECTION THREE

Work

Contractor agrees to perform and furnish all labor, supervision, materials, equipment, tools, machinery, transportation and supplies necessary for the completion of the Work required under this Contract in a professional and timely manner.

Project Description: The project is located at the intersection of Ashley River Road (SC 61) and Tobias Gadson Boulevard in Charleston, SC. The project generally consists of the construction of a dedicated right-turn lane from SC 61 to Tobias Gadson Boulevard.

This work shall include traffic control, asphalt surfacing, sub-grade preparation, storm drainage improvements, traffic signal modification, pavement marking, roadway signing, the installation of concrete curb and gutter, sidewalks and driveways.

Scope of Work/Plans (see Exhibit B, Scope of Work (with Appendices), for complete Scope of Work and Plans)

Miscellaneous:

1. This project is scheduled to be completed within ***ninety (90)*** calendar days from the issuance of a Notice to Proceed.
2. All work shall be performed as specified in the South Carolina State Highway Department Standard Specifications for Highway Construction, Edition 2007, *including revisions*.
3. The Project Manager will have the authority to adjust the rate of application as needed at the time of construction.
4. All existing driveways will be resurfaced to the right-of-way if applicable or as directed by Engineer.

5. The Contractor shall perform all Quality Control testing in accordance with SCDOT specifications at no additional cost to the County. Test results shall be given to the County's on-site inspector. Charleston County shall perform all Quality Assurance and Independent Assurance testing in accordance with SCDOT specifications. All required testing shall be performed by an individual certified by the SCDOT for the specific test being performed.
6. Mandatory project meetings between the County and the Contractor will be held weekly for the duration of the contract to discuss the progress of the work and provide schedule updates.
7. Contractor shall submit invoices no later than the 25th day of each month. The Contractor and the County's Project Manager, on or before the 21st day of each month, shall review and agree on the quantities detailed on an invoice being submitted for payment.
8. The Contractor shall provide temporary stabilization at the end of every work day using straw or equal control erosion when work has stopped for the day. Temporary and permanent grassing will be used at the end of the job or where work has ceased on the job for more than seven (7) days.
9. This project is subject to compliance of the NPDES General Permit for Storm Water Discharges from Large and Small Construction Activities SCR100000 (2006 CGP). This project's auto-coverage number is 65499. The 2006 CGP can be downloaded from the following website: <http://www.scdhec.gov/environment/water/docs/finalcgp.pdf> . The contractor(s) is responsible to ensure compliance, the requirements of the 2006 CGP, the Storm Water Management and Sediment Reduction Act of 1991 and the Federal Clean Water Act (CWA).

The 2006 CGP requires the Contractor to sign a "Co-Permittee Contract and Contractor Certification" statement (shown in Part 3.2D of the CGP). This certification has been incorporated into Attachment E, Required Forms of this document. By signing this certification, the contractor acknowledges that upon award and execution of the contract they will become a Co-Permittee of the NPDES General Permit and will be accountable to ensure the terms and conditions of the NPDES general permit are implemented. In addition, the contractor must certify that the NPDES certification statement and Co-Permittee status will be made part of all subcontractors working on the project.

The County's certified sediment and erosion control inspector and the Contractor's representative shall inspect all stormwater management and erosion and sediment control practices at least once every seven (7) calendar days until the Notice of Termination has been filed with SCDHEC, per the requirements of the 2006 CGP. However, the

Contractor shall correct any deficiencies noted within the inspection report.

10. The Contractor shall relocate the “Corbett’s Appliance Repairs” sign clear of the new right-of-way on tract number 3 as directed by and to the satisfaction of the Engineer and the property owner. Payment shall be lump sum in accordance with Section 808 of the SCDOT Standard Specifications.

Work is to be completed as indicated in Section Two after the issuance of the Notice to Proceed, absent any extensions as provided in Section Five hereof.

SECTION FOUR **Contract Price; Payment Terms**

- A. The Contractor is to perform the Work beginning on the Commencement Date until the termination of this Contract for the total, all inclusive price not to exceed Dollars (\$_____). Actual payments will be based on verified quantities actually incorporated in the Work as priced in Contractor’s Bid.

The amount as specified, may be increased or decreased by the County through the issuance of a change order or amendment. Any prices specified in Contractor’s Bid or any such change order or Amendment will remain firm for the term of this Contract or any Amendment thereto.

- B. Contractor shall submit monthly invoices itemizing all labor and materials for which payment is requested. Subject to approval of the invoice by the County, the County shall pay Contractor for the performance of the Work, including all labor and items necessary to accomplish and complete the Work, in accordance with all terms and conditions as stated in the Contract Documents, on the following basis:

Contractor shall submit invoices in the format that shall be provided by the County at the pre-construction meeting. Failure to follow the format may result in payment delays.

All invoices will be processed by the County once a month. All partial payments will be based upon Contractor's invoices, approved by the Project Manager, for the Work performed and materials completely in place in accordance with the Contract and to the satisfaction of the Project Manager. From the total of the amounts so ascertained, ninety percent (90%) shall be paid the Contractor and ten percent (10%) shall be retained by the County until after the completion of all the Work to the satisfaction of the County and the Department. After completion of ninety-five percent (95%) of the project, the retainage may be reduced to five percent (5%).

- C. Invoices will be submitted to the Project Manager and the invoice will contain IFB No. 4376-10L.
- D. With regard to items (which term includes without limitation any and all materials) in the Contract Price, the County reserves the right to increase the Contract Quantities by an amount not to exceed in value twenty percent (20%) of the total Contract Price or decrease the Contract Quantities by an amount not to exceed in value twenty percent (20%) of the total Contract Price. Payment will be made based on the unit prices submitted by Contractor and incorporated by reference in this Contract.

No claim shall be made by the Contractor for any loss of anticipated profits because of any such alteration, or by reason of any variation between the approximate quantities and the quantities of work as done. If the altered or added work is of sufficient magnitude as to require additional time in which to complete the Project, such time adjustment will be made at the determination of the County.

- E. No claim by the Contractor for any adjustment under this Contract shall be allowed if asserted after Final Payment under this Contract.
- F. Special income tax withholding, as set forth more fully below in the Section of this Contract entitled "State and Local Taxes": two percent (2%) income tax withholding as required by Section 12-8-540 and 12-8-550, S.C. Code of Laws (1976, as amended) for certain out-of-state contractors and subcontractors.
- G. When County requires substantiating information Contractor shall submit data justifying dollar amounts in question.

SECTION FIVE

Time

Contractor agrees to punctually and diligently perform all parts of the Work at the time scheduled by the Contractor which shall be subject to change by the County as deemed necessary or convenient to the overall progress of the Project. In this connection, Contractor agrees that the Contractor will keep itself continually informed of the progress of the job and will, upon its own initiative, confer with the County so as to plan its work in coordinated sequence with the Work of the County and of others and so as to be able to expeditiously undertake and perform the Work at the time most beneficial to the entire Project. The Contractor will be liable for any loss, costs, or damages sustained by the County for delays in performing the Work hereunder, other than excusable delays for which Contractor shall be granted an extension of time. If, in the reasonable opinion of the County, Contractor is not complying with the progress schedule or will not meet the completion date, County may require the Contractor to provide additional manpower, or work overtime, or expedite materials, and Contractor shall take the necessary steps to comply, all without increase in Contract Price.

If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the County, or by any separate contractor employed by the County, or by changes in the Work, or by labor disputes, fire, unusual delay in transportation, unusually severe weather conditions, unavoidable casualties, delays specifically authorized by the County, or by causes beyond the Contractor's control, avoidance, or mitigation, and without the fault or negligence of the Contractor and/or subcontractor or supplier at any tier, then the Contract time shall be extended by change order for such reasonable time, if any, as the County may determine that such event has delayed the progress of the Work or overall completion of the Work, if the Contractor complies with the notice and documentation requirements set forth below.

Any claim for extension of time, except as provided for below with regards to rain delays, shall be made in writing to the County, not more than five (5) calendar days from the beginning of the delay. The notice shall indicate the cause of delay upon the progress of Work. If the cause of the delay is continuing, the Contractor must give written notice every week to the County. Within five (5) calendar days after the elimination of any such delay, the Contractor shall submit further documentation of the delay and a formal change order request for an extension of time for such delay.

The written request for a time extension shall state the cause of the delay, the number of days extension requested, and such analysis and other documentation to demonstrate a delay in the progress of the Work

or the overall Project completion. If the Contractor does not comply with the above notice and documentation requirements, the claim for the delay shall be waived by the Contractor.

Extensions of time shall be the Contractor's sole remedy for any and all delays, hindrances, or obstructions. No payment or compensation of any kind shall be made to the Contractor for damages because of hindrance or obstruction in the orderly progress of the Work or delay from any cause in the progress of the Work, whether such hindrances or delays be avoidable or unavoidable. Contractor expressly agrees not to make, and hereby waives any claim for damages on account of any delay, obstruction, or hindrance for any cause whatsoever, including but not limited to the aforesaid cause and agrees that the Contractor's sole right and remedy in the case of any delay, obstruction, or hindrance, shall be an extension of the time fixed for completion of the Contract. Without limitation, the County's exercise of its rights under the changes clause, regardless of the extent or number of such changes, shall not under any circumstances be construed as compensable, other than through an extension of time, it being acknowledged that the Contract amount includes and anticipates any and all delays, hindrances, or obstructions whatsoever from any cause, whether such be avoidable or unavoidable.

Weather delays are generally referred to as "rain days", and shall apply to days when the Work cannot be undertaken due to adverse weather conditions. Time for hot, cold, and/or windy conditions have been allowed for in the allocated date of completion. An average number of rain days are included in the completion date determination. This was determined by the following method:

Using the NOAA monthly reports, all days in each month in which rainfall in any part of the day exceeded .10 inch has been calculated and averaged. These averages are as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
9	10	8	8	9	9	14	16	11	16	7	12

Rain delays, therefore, will only be considered when the number of days in any month in which rainfall, as recorded by the weather bureau as .10 inch or greater, exceeds the number of days shown. Notwithstanding the days shown on the monthly report, time extensions for rain days will only be considered based upon actual conditions at the Project Site. If, in the opinion of the Contractor, adverse weather causes unsuitable conditions that prevent the Contractor from proceeding with the Work at any time during the term of this Contract, the Contractor shall submit written notification to the County's Representative within twenty-four (24) hours of the onset of said conditions. Notwithstanding the requirements of Section 18, the Contractor shall make a claim for time extension due to rain delays within five (5) calendar days of issuance of the NOAA monthly report.

SECTION SIX

Insurance Requirements

The Contractor, at its own expense, shall at all times during the term of the Contract, maintain insurance as required herein (see Sample Forms) and previously incorporated by reference. The County shall not execute the Contract until Contractor has submitted acceptable Insurance Certificate(s) and Endorsement(s), which must be submitted within five (5) business days of receipt of the Notice of Award, and which reflect that the required coverages are in place and that all premiums have been paid. Refusal or failure to submit such Insurance Certificate(s) and Endorsement(s) shall constitute grounds for the County to revoke its Notice of Award, forfeit bid security, and award the Contract to another Contractor. The County may contact the Contractor's insurer(s) or insurer(s)' agent(s) directly at any time regarding Contractor's coverages, coverage amounts, or other such relevant and reasonable issues related to this Contract. The Contractor shall also require any sub-contractors to carry the same coverages in the same amounts.

Faxed Insurance Certificate(s) and Endorsement(s) will be accepted if received no later than the time of contract execution and the original documents are received within one (1) business day after receipt of the fax transmittals.

The County must be advised immediately of any changes in required coverage's.

SECTION SEVEN
Payment and Performance Security

Contractor shall provide and maintain payment and performance bonds in the amount of _____ (\$_____) exclusive of change order

SECTION EIGHT
Compliance with Legal Requirements

All applicable federal, state and local laws, ordinances, and rules and regulations of any authorities (including, but not limited to, any laws, ordinances or regulations relating to the S.C. Department of Revenue or the S.C. Board of Contractors) shall be binding upon the Contractor throughout the pendency of this Work. The Contractor shall be responsible for compliance with any such law, ordinance, rule or regulation, and shall hold the County harmless and indemnify same in the event of non-compliance as set forth in the Contract.

By signing a bid, the Contractor certifies that it will comply with the applicable requirements of Title 8, Chapter 14 of South Carolina Code of Laws and agree to provide to the State upon request any documentation required to establish either; (a) that Title 8, Chapter 14 is inapplicable to the Contractor and its subcontractors or sub-subcontractors; or (b) that the Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14.

Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the Court or imprisoned for not more than five years, or both."

Contractor agrees to include in any contracts with subcontractors, language requiring subcontractors to (a) comply with applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-contractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14.

The Contractor shall certify agreement to abide by the requirements under Title VI of the Civil Rights Act of 1964, and other non-discrimination authorities Federal Executive Order Number 11246, as amended, and specifically the provisions of the equal opportunity clause.

Contractor shall comply with all federal, state and local laws, ordinances, rules and regulations of any authorities throughout the duration of this Contract. The Contractor shall be responsible for compliance with any such law, ordinance, rule or regulation, and shall hold County harmless and indemnify same in the event of non-compliance.

Contractor agrees to abide by the requirements under Federal Executive Order Number 11246, as amended, including specifically the provisions of the equal opportunity clause.

SECTION NINE
Drug-free Workplace Act

Contractor shall comply with the South Carolina Drug-free Workplace Act, Section 44-107-10 et seq., S.C. Code of Laws (1976, as amended). The County requires all Contractors executing contracts for a stated or estimated value of \$50,000 or more to sign a Drug-free Workplace Certification form prior to the issuance of the Notice to Proceed.

SECTION TEN
Material and Workmanship; Warranties and Representations

Contractor represents that its staff is knowledgeable about and experienced in performing the Work required in this Contract and warrants that it will use best skill and attention to provide above described Work in a professional, timely manner.

Contractor warrants and represents that it shall be responsible for all subcontractors working directly for it, as well as for their work product, as though Contractor had performed the Work itself.

- A. All equipment, materials and articles incorporated in the Work covered by the Contract and supplied by the Contractor are to meet the SCDOT Standard Specifications, unless otherwise stated herein. Unless otherwise specifically provided in this Contract, reference to any equipment, material, article or patented process, by trade name, make or catalog number, shall not be construed as limiting competition. When requested, the Contractor shall furnish to the Contracts and Procurement Director, for approval the name of the manufacturer, the model number, and other identifying data and information respecting the performance, capacity, nature and rating of the machinery and mechanical and other equipment which the Contractor contemplates incorporating in the Work. When required by this Contract or when called for by the Contracts and Procurement Director, the Contractor shall provide full information concerning the material or articles which he contemplates incorporating in the Work. When so directed, samples shall be submitted for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material and articles installed or used without the required prior approval shall be at the risk of subsequent rejection.
- B. Any and all manufacturers' warranties on any equipment or materials will be passed on to the County and copies of said warranties will be furnished by the Contractor to the County upon completion and final acceptance of the Work..
- C. The Contracts and Procurement Director may, in writing, require the Contractor to remove from the Work Site any employee the Contracts and Procurement Director deems incompetent, careless or otherwise objectionable.
- D. In addition to any manufacturer's warranties, all labor and materials are warranted to be free from defects for a period of twenty-four (24) months after the date of Final Payment by County.

SECTION ELEVEN
Retention of Records

The Contractor agrees to maintain for three (3) years from the date of Final Payment, or until the end of any audit or closure of all pending matters under this Contract, whichever is later, all books, documents, papers, and records pertinent to this Contract. The Contractor agrees to provide to the County, any federal grantor agency, the Comptroller General of the United States, any state grantor agency, any assignee, or any of their duly authorized representatives access to such books, documents, papers, and records for the

purpose of examining, auditing, and copying them. The Contractor further agrees to include these provisions in any subcontracts issued in connection with this Contract.

SECTION TWELVE

State and Local Taxes

Except as otherwise provided, Contract prices shall include all applicable state and local taxes.

If applicable, two percent (2%) income tax withholding shall be withheld from each and every payment pursuant to Sections 12-8-540 and 12-8-550 of the South Carolina Code of Laws (1976, as amended) for certain out-of-state contractors, and such sums will be paid over to the South Carolina Department of Revenue (the "SCDOR"). When and if County receives an executed SCDOR Form I-312, Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, such withholding shall cease.

Contractor shall calculate that portion of the Contract which is subject to the seven and one half percent (7.5%) South Carolina sales and/or use tax, which amount shall be itemized and shown on all invoices, and shall be paid to the SCDOR by Contractor. If Contractor is a non-South Carolina company, the County will withhold said amount from all invoices and remit payment to the SCDOR, unless Contractor furnishes County with a valid South Carolina Use Tax Registration Certificate Number.

Contractor shall indemnify and hold harmless the County for any loss, cost, or expense incurred by, levied upon or billed to the County as a result of Contractor's failure to pay any tax of any type due in connection with this Contract.

SECTION THIRTEEN

Independent Contractor

Contractor is an independent contractor and shall not be deemed the agent or employee of the County for any purpose whatsoever. Contractor shall not hold himself out as an employee of the, and shall have no power or authority to bind or obligate the County in any manner, except the County shall make payment to Contractor for work and expenses as herein provided. Contractor shall obtain and maintain all licenses and permits required by law for performance of this Contract by him or his employees, agents, and servants. Contractor shall be liable for and pay all taxes required by local, state or federal governments, including but not limited to social security, Workers' Compensation, employment security, and any other taxes and licenses or insurance premiums required by law. No employee benefits of any kind shall be paid by the County to or for the benefit of Contractor or its employees, agents, or servants by reason of this Contract.

SECTION FOURTEEN

Inspection and Acceptance, No-Claim Affidavits

- A. All Work (which term includes, but is not restricted to materials, workmanship, manufacture and fabrication of components) shall be subject to inspection and test by the County and/or SCDOT at all reasonable times and places prior to acceptance. Any such inspection and test is for the sole benefit of the County and/or SCDOT and shall not relieve the Contractor of the responsibility of providing quality supplies to comply with the Contract requirements. No inspection or test by the County and/or SCDOT shall be construed as constituting or implying acceptance. Inspection or test shall not relieve the Contractor of the responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights (including warranty rights) of the County and/or SCDOT after acceptance of the completed Work. The Contractor shall conduct and pay for all tests required in the Scope of Work.

- B. The Contractor shall, without charge, replace any material or correct any workmanship found by the County not to conform to the Contract requirements, unless the County consents in writing to accept such material and workmanship with an appropriate adjustment in Contract Price. The Contractor shall promptly remove rejected material from the premises.
- C. Upon completion and acceptance of all Work, the Contractor shall provide the Project Manager with written affidavits. Such affidavits shall state that all claims arising by virtue of the Contract have been paid in full with any exceptions listed on such affidavits.

SECTION FIFTEEN

Cleanup Work

- A. During progress of Work, Contractor will keep the site and affected adjacent areas cleaned up. Remove all rubbish, surplus materials, surplus excavates, and unneeded construction equipment so that the sites will be inconvenienced as little as possible.
- B. Where materials or debris have washed or flowed into or have been placed in existing watercourses, ditches, gutters, drains, pipes, or structures by work done under this Contract, Contractor will remove and dispose of such material or debris during the progress of the Work.
- C. Upon completion of the Work, Contractor will leave all ditches, channels, drains, pipes, structures and work, etc. in a clean and neat condition.
- D. Contractor will remove all debris from any grounds which have been occupied by the Contractor and leave the roads and all parts of the premises and adjacent site affected by Contractor's operations in a neat and satisfactory condition.
- E. Contractor will restore or replace, when and as directed, any public or private property damage by Contractor's work, equipment or employees to a condition at least equal to that existing immediately prior to the beginning of the operations.

SECTION SIXTEEN

Conditions Affecting the Work

- A. The Contractor shall be responsible for having taken steps reasonably necessary to ascertain the nature and location of the Work, and the general and local conditions which can affect the Work or the cost thereof. Any failure by the Contractor to do so will not relieve it from responsibility for successfully performing the Work without additional expense to the County. The County assumes no responsibility for any understandings or representations concerning conditions or anything related to this Contract, made by any of its officers or agents prior to the execution of this Contract, unless such understandings or representations by the County are expressly stated in this Contract.
- B. The Contractor has visited and inspected the Work Site and accepts the conditions at the Work Site as they eventually may be found to exist and warrants and represents that this Contract can and will be performed under such conditions, and that all materials, equipment, labor and other facilities required because of any unforeseen conditions (physical or otherwise) shall be wholly at the Contractor's own cost and expense, anything in this Contract to the contrary notwithstanding.

SECTION SEVENTEEN
Safety of Persons and Property

- A. The following provisions are in addition to those pertinent sections contained in the standard specifications.
- B. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:
 - (i) Employees on the Work Site and other persons who may be affected thereby:
 - (ii) The Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
 - (iii) Other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
- C. The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.
- D. The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting and maintaining danger signs and other warnings against hazards as long as such hazards exist. The Contractor shall also promulgate safety regulations and notify owners and users of adjacent sites and utilities of all construction and related activities.
- E. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.
- F. The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible except damage or loss attributable to acts or omissions of the County or anyone directly or indirectly employed by it, or by anyone for whose acts the County may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 23, Indemnification, herein.
- G. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the County.
- H. The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.
- I. In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's best discretion, to prevent threatened damage, injury or loss.

SECTION EIGHTEEN

Change Orders

One or more changes to the Work within the general scope of this Contract may be ordered by change order. The County may also issue construction change directives, as set forth below. The Contractor shall proceed with any such changes, and same shall be accomplished in strict accordance with the following terms and conditions:

- A. Change orders shall be submitted on the forms and pursuant to the procedures of the County. Change order shall mean a written order to the Contractor executed by the County after execution of this Contract, directing a change in the Work. A change order may include a change in the Contract Price, (other than a change attributable to damages to the Contractor for delay, which the Parties agree are not allowed under this Contract) or the time for the Contractor's performance, or any combination thereof. Where there is a lack of total agreement on the terms of a change order, the County may also direct a change in the Work in the form of a construction change directive, which will set forth the change in the Work and the change, if any, in the Contract Price or time for performance, for subsequent inclusion in a change order;
- B. Any change in the Contract Price resulting from a change order shall be determined by use of the Unit Prices set forth in the Contractor's bid.
- C. The execution of a change order by the Contractor shall constitute conclusive evidence of the Contractor's contract to the ordered changes in the Work, this Contract as thus amended, the Contract Price, and the time for performance by the Contractor. The Contractor, by executing the change order, waives and forever releases any claim against the County for additional time or compensation for matters relating to or arising out of or resulting from the Work included within or affected by the executed change order.
- D. The Contractor shall notify and obtain the consent and approval of the Contractor's surety with reference to all change orders if such notice, consent or approval is required by the County, the Contractor's surety or by law. The Contractor's execution of the change order shall constitute the Contractor's warranty to the County that the surety has been notified of, and consents to, such change order and the surety shall be conclusively deemed to have been notified of such change order and to have expressly consented thereto.

SECTION NINETEEN

Claims and Disputes

- A. Definition. A Claim is a demand or assertion by one of the Parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, and extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the County and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the Party making the Claim. Following all limits and procedures herein shall be a condition precedent to Contractor's entitlement to any increased compensation from any claim.
- B. Time Limits on Claims. Claims by either Party must be made within ten (10) business days after occurrence of the event giving rise to such Claim or within ten (10) business days after the

claimant first recognizes the condition giving rise to the Claim, whichever is later. An additional Claim made after the initial Claim has been implemented by change order will not be considered.

- C. Continuing Contract Performance. Pending final resolution of a Claim request for review of site conditions, request for information, or resolution of a dispute, unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the County shall continue to make payments in accordance with the Contract Documents.
- D. Waiver of Claims: Final Payment. The making of Final Payment shall constitute a waiver of Claims by the County except those arising from:
 1. Liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
 2. Failure of the Work to comply with the requirements of the Contract Documents; or
 3. Terms of special warranties required by the Contract Documents.
- E. Claims for Additional Costs. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 16(I). If the Contractor believes additional cost is involved for reasons including but not limited to (1) an order by the County to stop the Work where the Contractor was not at fault, (2) a written order for a minor change in the Work, (3) failure of payment by the County, (4) termination of the Contract by the County, (5) other reasonable grounds, Claim shall be filed in accordance with the procedure established herein.
- F. Claims for Additional Time. See Section Five herein.
- G. Injury or Damage to Person or Property. If either Party to the Contract suffers injury or damage to person or property because of an act or omission of the other Party, of any of the other Party's employees or agents, or of others for whose acts such Party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other Party within a reasonable time not exceeding 10 business days after first observance. The notice shall provide sufficient detail to enable the other Party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided herein.

SECTION TWENTY

Damages

The Contractor agrees that, if the Work, or any part thereof, is not completed within the time agreed upon in this Contract or any extension thereof, the Contractor or its sureties shall be liable to the County in the amount specified below for each and every calendar day the completion of the Work is delayed beyond the calendar date in this Contract, as fixed and agreed liquidated damages and not as a penalty; and the County shall have the right to deduct from and retain out of monies which may be then due or which may become due and payable to the Contractor, the amount of such liquidated damages; and if the amount so retained by County is not sufficient to pay in full such liquidated damages, the Contractor shall pay to the County or its sureties the amount necessary to effect payment in full of such liquidated damages.

Any adjustment of the Contract time for completion of the Work granted in accordance with the provisions of this Contract will be considered in the assessment of liquidated damages.

Permitting the Contractor to continue and finish the Work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the County of any of its rights under this Contract.

Schedule of Liquidated Damages for Each Day of Overrun in Contract Time:

Original Contract Amount From <u>More Than</u>	To and <u>Including</u>	Daily Charge Calendar Day <u>or Fixed Date</u>
\$ 0	\$ 50,000	\$ 100.00
50,000	100,000	200.00
100,000	500,000	400.00
500,000	1,000,000	600.00
1,000,000	2,000,000	800.00
2,000,000	5,000,000	1,100.00
5,000,000	10,000,000	1,400.00
10,000,000	and greater	1,800.00

Additional provisions concerning the Contractor's liability in certain specific events or circumstances are set forth throughout the Scope of Work. By signing this Contract, Contractor expressly agrees to the terms thereof.

SECTION TWENTY-ONE

Suspension of Work

The Contracts and Procurement Director may order, in writing, the Contractor to suspend, delay, or interrupt all or any part of the Work for such period of time as he may determine to be appropriate for the convenience of the County. The County may suspend performance of its obligations under this Contract in good faith for the convenience of the County or to investigate matters arising in the Work.

The Contracts and Procurement Director may order suspension of the Work in whole or in part for such time as he deems necessary because of the failure of the Contractor to comply with any of the requirements of this Contract, and the Contract's completion date shall not be extended on account of any such suspension of Work.

When the Contracts and Procurement Director orders any suspension of the Work under the subparagraph above, the Contractor shall not be entitled to any payment for Work with respect to the period during which such Work is suspended and shall not be entitled to any costs or damages resulting from such suspension.

The rights and remedies of the County provided in this Section are in addition to any other rights and remedies provided by law or under this Contract.

SECTION TWENTY-TWO

Modification of Contract

The County's Contracts and Procurement Director has the unilateral right to modify this Contract when the modification is in the best interest of the County, provided however, the Contractor is given written notice of any such modification and the County is responsible for paying Contractor for any additional expenses incurred by Contractor which relate to the modification. Subject to the above, the Contractor shall immediately notify the County in writing of any proposed adjustment in its fee. The Contractor is

obligated to perform the revised contract when so directed by the Contracts and Procurement Director and the County is obligated to pay for the work performed pursuant to the modification. No claim by the Contractor for an adjustment hereunder shall be allowed if asserted after Final Payment under this Contract.

SECTION TWENTY-THREE

Termination

A. For Convenience

The Contracts and Procurement Director, by advance written notice, may terminate this Contract when it is in the best interests of the County. If this Contract is so terminated, the Contractor shall be compensated for all necessary and reasonable direct costs of performing the Work actually accomplished. The Contractor will not be compensated for any other costs in connection with a termination for convenience. The Contractor will not be entitled to recover any damages in connection with a termination for convenience.

B. For Default

If the Contractor refuses or fails to perform the Work or any separable part thereof in a timely or workmanlike manner in accordance with the Contract Documents, or otherwise fails, in the sole opinion of the County, to comply with any of the terms and conditions of the Contract Documents deemed, in the sole opinion of the County, to be material (including, without limitation, the requirement that Contractor obtain and maintain in force all necessary permits), such refusal or failure shall be deemed a default under this Contract.

In the event of a default under this Section, County shall have the right to terminate forthwith this Contract by written notice to the Contractor. In the event of such default, the advance notice period for termination is waived and the Contractor shall not be entitled to any costs or damages resulting from a termination under this section.

Whether or not the Contractor's right to proceed with the Work is terminated, it and its sureties shall be liable for any damage to the County resulting from Contractor's default. Any wrongful termination for default shall be deemed by the Parties a termination for convenience.

C. Termination for Non-Appropriation of Funds

The Contracts and Procurement Director, by written advance notice, may terminate this Contract in whole or in part in the event that sufficient appropriation of funds from any source (whether a federal, state, County or other source) are not made or sufficient funds are otherwise unavailable, in either case, to pay the charges under this Contract. If this Contract is so terminated, the Contractor shall be compensated for all necessary and reasonable direct costs of performing the Work actually provided to the date of such termination. The Contractor will not be compensated for any other costs in connection with a termination for non-appropriation. The Contractor will not be entitled to recover any damages in connection with a termination for non-appropriation, including, but not limited to, lost profits.

D. Rights Cumulative

The rights and remedies of the County provided in this Section are in addition to any other rights and remedies provided by law or under this Contract.

SECTION TWENTY-FOUR

Indemnification

Except for expenses or liabilities arising from the negligence or intentional acts of the County, the Contractor hereby expressly agrees to indemnify and hold the County harmless against any and all expenses and liabilities arising out of the negligent performance, action or inaction of the Contractor in conduct of this Contract, as follows:

For matters other than those arising from the rendering or failure to render professional services, the Contractor expressly agrees to the extent that there is a causal relationship between its negligence, action or inaction, or the negligence, action or inaction of any of its employees or any person, firm or corporation directly or indirectly employed by the Contractor and any damage, liability, injury, loss or expense (whether in connection with bodily injury or death or property damage) that is suffered by the County and/or its officers or employees or by any member of the public, to indemnify and save the County and its officers and employees harmless against any and all liabilities, penalties, demands, claims, lawsuits, losses, damages, costs, and expenses arising out of the negligence, action or inaction of the Contractor, regardless of whether such liabilities, penalties, demands, claims, lawsuits, losses, damages, costs and expenses are caused in part by the County. Such costs are to include, without limitation, defense, settlement and reasonable attorney's fees incurred by the County and its employees. This promise to indemnify shall include, without limitation, bodily injuries or death occurring to the Contractor's employees and any person, directly or indirectly employed by the Contractor (including, without limitation, any employee of any subcontractor), the County's officers or employees, the employees of any other independent contractors, or occurring to any member of the public. When the County submits notice, Contractor shall promptly defend any aforementioned action.

For matters arising out of the rendering or failure to render professional services, the Contractor will indemnify and save the County and its officers and employees harmless from and against all liabilities, penalties, demands, claims, lawsuits, losses, damages, costs and expenses arising out of or resultant from any negligent act, error or omission of the Contractor in the rendering or failure to render professional services under this Contract. Such costs are to include, without limitation, defense, settlement and reasonable attorneys' fees incurred by the County and its officers and employees. This promise to indemnify shall include, without limitation, bodily injuries or death occurring to the Contractor's employees and any person, directly or indirectly employed by the Contractor (including, without limitation, any employee of any subcontractor), the County's officers or employees, the employees of any other independent contractors, or occurring to any member of the public. When the County submits notice of claim that triggers the indemnity, the successful Bidder shall promptly defend any aforementioned action at its own cost.

The limits of insurance required in this Contract shall not limit the Contractor's obligations under this Section. The terms and conditions contained in this Section shall survive the termination of the Contract or the suspension of the Work hereunder. To the extent that any liabilities, penalties, demands, claims, lawsuits, losses, damages, costs and expenses are caused in part by the acts of the County, the Contractor's obligations shall be reduced in proportion to the County's fault. The obligations herein shall also extend to any actions by the County to enforce this indemnity obligation. The recovery of costs and fees all extend to those incurred in the enforcement of this indemnity.

SECTION TWENTY-FIVE

Gratuities and Kickbacks

Gratuities. It shall be unethical for any person to offer, give or agree to give any employee or former employee, or for any employee or former employee to solicit, demand, accept, or agree to accept from another person a gratuity or an offer of employment in connection with any decision, approval,

disapproval, recommendation, preparation or any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter pertaining to any program requirement of a contract or subcontract, or to any solicitation or proposal therefore.

Kickbacks. It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor, or to hire any subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

Violation of this clause may result in Contract termination.

SECTION TWENTY-SIX

Labor; Subcontractors; Employment Consideration

The Contractor shall not contract with a proposed person or entity to whom the County has made reasonable and timely objections. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable and timely objection.

The Contractor shall enforce strict discipline and good order among its employees and other persons carrying out the Contract.

Employment of labor by Contractor shall be effected under conditions which are satisfactory to County. Contractor shall remove or cause to have removed from the project any employee or employees who are considered unsatisfactory by the County.

Contractor assumes the responsibility for assuring that its working forces are compatible with other forces on the job and Contractor is responsible for making himself aware of those forces. Contractor will furnish a competent representative who is to be kept available to the site to represent the Contractor for the purpose of receiving notices, orders and instruction.

SECTION TWENTY-SEVEN

Other Contracts

The County reserves the right to undertake or award other contracts for additional work, and may elect to complete portions of the work included in this Contract using its own forces or through other contracts, and the Contractor shall fully cooperate with such other contractors, County employees and carefully fit its own work to such work as may be directed by the County. The Contractor shall not commit or permit any act by its forces or subcontractors which will interfere with the performance of work by any other contractor or by County and or Department employees.

SECTION TWENTY-EIGHT

Permits and Licenses

The Contractor shall, without additional expense to the County, be responsible for obtaining and maintaining all necessary licenses and permits required by the State of South Carolina, a municipality or the County or any other authority having jurisdiction. Prior to execution of a contract, the Contractor may be required to provide a copy of its current applicable Contractor's License issued by the State of South Carolina and the County. Any subcontractor must comply with the regulations promulgated in the South Carolina Contractor's Licensing Board as enforced by the South Carolina Licensing Board for Contractors. Contractor's (and or any subcontractor's) License Number, Person's Name and Business Name must all be shown on all required licenses.

SECTION TWENTY-NINE**Assignment**

The Contractor shall not assign in whole or in part this Contract without the prior written consent of the County. The Contractor shall not assign any money due or become due to it under said Contract without the prior written consent of the County.

SECTION THIRTY**Controlling Law**

The laws of South Carolina shall govern this Contract. All litigation arising under this Contract, shall be litigated only in a nonjury hearing in the Court of Common Pleas, Ninth Judicial Circuit, Charleston County, South Carolina. The prevailing Party shall be entitled to recover attorney's fees and costs of the litigation.

SECTION THIRTY-ONE**Severance**

Should any part of this Contract be determined by a Court of competent jurisdiction to be invalid, illegal, or against public policy, said offending Section shall be void and of no effect and shall not render any other Section herein, nor this Contract as a whole, invalid.

SECTION THIRTY-TWO**County's Designated Representative(s)**

In the event that any questions or problems arise in the course of performing this Contract, Contractor shall immediately contact one or more of the following County representatives:

E. Steven Taylor, C.P.M., Director
 Charleston County Procurement Department
 4045 Bridge View Drive, Suite B250
 North Charleston, South Carolina 29405
 (843) 958-4750

SECTION THIRTY-THREE**Notices**

Whenever any provision of this Contract requires the giving of written notice, it shall be deemed to have been validly given if delivered by person or by registered mail to the following:

If to the County:

E. Steven Taylor C.P.M., Director
 Charleston County Procurement Department
 4045 Bridge View Drive, Suite B250
 North Charleston, South Carolina 29405

If to the Contractor:

[To be completed upon award]

SECTION THIRTY-FOUR**Non-Waiver**

Any waiver of any default by either Party to this Contract shall not constitute waiver of any subsequent default, nor shall it operate to require either Party to waive, or entitle either Party to a waiver of, any subsequent default hereunder.

SECTION THIRTY-FIVE**Entire Contract**

This Contract constitutes the entire understanding and Contract between the Parties hereto and supersedes all prior and contemporaneous written and oral contracts between the Parties and their predecessors in interest regarding the subject matter of this Contract. This Contract may not be changed, altered, amended, modified, or terminated orally, except as specifically provided, and any such change, alteration, amendment, or modification must be in writing and executed by the Parties hereto.

IN WITNESS WHEREOF, the Parties executed this Contract under their several seals the day and year first written above.

WITNESSETH:**CONTRACTOR:**

Name
Title

COUNTY OF CHARLESTON

Charleston, SC

E. Steven Taylor, C.P.M.
Contracts and Procurement Director

ATTACHMENT D

SAMPLE FORM(S)

INSURANCE REQUIREMENTS (Contracts Greater Than \$25,000)

Contractors working for Charleston County are required to procure and maintain for the duration of their contract with the County insurance against claims for injuries to persons or damages to property which may arise from or in connection with work performed by the Contractor, his agents, representatives, employees or subconsultants. The cost of such insurance shall be the responsibility of the Contractor.

- A. The Contractor shall carry liability insurance with a reliable company licensed to do business in South Carolina. Coverage shall be at least broad as:
 - 1. Insurance Services Office Commercial General Liability Coverage Form (“occurrence”) CG 00 01 10 93.
 - 2. Insurance Services Office Business Auto Coverage Form CA 00 01 6 92 covering automobile liability, code 1 “any auto”.
- B. Contractor shall carry workers’ compensation as required by the State of South Carolina and Employers Liability insurance (including applicable occupation disease provisions and all state endorsements.)
- C. Contractor shall maintain limits no less than the following:
 - 1. **GENERAL LIABILITY** : \$1,000,000 combined single limit per occurrence for bodily injury, property damage, and personal injury with a \$2,000,000 general aggregate limit.
 - 2. **AUTOMOBILE LIABILITY**: \$1,000,000 combined single limit per accident for bodily injury and property damage.
 - 3. **WORKERS’ COMPENSATION**: Statutory limits are required by South Carolina state law, and employer’s liability limits of \$100,000 per accident.
- D. Required policies are to contain, or be endorsed to contain, the following provisions:
 - 1. General Liability and Automobile Liability Coverages

The County, its officials, employees and volunteers are to be covered as additional insureds as respects: Liability arising out of activities performed by or on behalf of the Contractors; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the County, its officials, employees or volunteers. To accomplish this objective, the County shall be named as an additional insured under the Contractor’s general liability policy by attaching Insurance Services Office Commercial General Liability Endorsement CG2010 10 93 (Additional Insured - Owners, Lessees or Contractors - Form B) or its equivalent. Contractors’ insurance coverage shall be primary insurance as respects the County, its officials, employees and volunteers. Any insurance or self-insurance maintained by the County, its officials, employees, or volunteers shall be in excess of the Contractor’s insurance and shall not be required to contribute. To accomplish this objective, the following wording should be incorporated in the previously referenced additional insured endorsement.

Other Insurance: This insurance is primary, and our obligations are not affected by any other insurance carried by the additional insured whether primary, excess, contingent or on any other basis.

Any failure to comply with reporting provisions of the Contractor's policies shall not affect coverage provided to the County, its officials, employees or volunteers.

2. Workers' Compensation

The Contractor shall agree to waive all rights of subrogation against the County, its officials, employees and volunteers for losses arising from work performed by the Contractor for the County.

- E. Any deductibles or self-insured retentions larger than \$5,000 must be declared to and approved by the County.
- F. Each insured policy required by the County shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice has been given to the County.
- G. All coverages for subconsultants shall be subject to all the requirements stated herein.
- H. Insurance must be placed with an approved insurance company with current Best's rating of A+, A, or A-. Exceptions to this requirement must be approved in writing by the Department of Risk Management.
- I. If the County elects to assign the attached Contract to the Charleston Public Facilities Corporation, or the Charleston County Transportation Committee, as set for in the contract, then the Charleston Public Facilities Corporation or the Charleston County Transportation Committee shall be named an additional insured along with the County and shall be equally entitled to all coverages and benefits of the policies.
- J. Contractor shall furnish the County with Certificates of Insurance noting the endorsements. The Certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements are to be received and approved by the County, Procurement Department, before work commences. The County reserves the right to require complete, certified copies of all required insurance policies, at any time.

Required certificates should be mailed to:

Charleston County Procurement Department
 Lonnie Hamilton, III Public Services Building
 4045 Bridge View Drive
 North Charleston, South Carolina 29405

POLICY NUMBER:
CG 20 10 10 93

COMMERCIAL GENERAL LIABILITY

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

**ADDITIONAL INSURED - OWNERS, LESSEES OR
CONTRACTORS (FORM B)**

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART SCHEDULE

Name of Person or Organization:

THE COUNTY OF CHARLESTON, CHARLESTON, SOUTH CAROLINA
THE CHARLESTON PUBLIC FACILITIES CORPORATION (if applicable)
THE CHARLESTON COUNTY TRANSPORTATION COMMITTEE (if applicable)

(See Assignment Section in the attached Contract to determine whether Charleston Public Facilities Corporation or Charleston County Transportation Committee are applicable.)

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

WHO IS AN INSURED (Section II) is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of your ongoing operations performed for that insured.

CHARLESTON COUNTY SAMPLE CERTIFICATE OF INSURANCE

Producer
ABC AGENCY
123 MAIN STREET
ANYTOWN, SC 12345

This certificate is issued as a matter of information only and confers no rights upon the certificate holder. This certificate does not amend, extend or alter the coverage afforded by the policies below.

COMPANIES AFFORDING COVERAGE

Insured
XYZ CONTRACTOR
P.O. BOX 000
ANYTOWN, SC 12345

Company A (Issuing Company)

Company B

COVERAGES

This is to certify that the policies of insurance listed below have been issued to the insured named above for the policy period indicated, notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain. The insurance afforded by the policies described herein is subject to all the terms, exclusions, and conditions of such policies. Limits shown may have been reduced by paid claims.

CO LTR	Type of Insurance	Policy Number	Policy Eff. Date (MM/DD/YY)	Policy Exp. Date (MM/DD/YY)	LIMITS	
	GENERAL LIABILITY ☒ Comm. General Liability ☐ Claims Made ☒ Occur ☐ Owner's & Contract's Prot ☒ Holder Named as Additional Insured	XXXXXXXXXX	XX/XX/XX	XX/XX/XX	General Aggregate	\$2,000,000
					Prod-Comp/Op Agg	\$1,000,000
					Pers. & Adv. Injury	\$1,000,000
					Each Occurrence	\$1,000,000
					Fire Damage (One Fire)	\$50,000
					Med Exp. (Any one Person)	\$5,000
	AUTOMOBILE LIABILITY ☒ Any Auto ☐ All Owned Autos ☐ Scheduled Autos ☐ Hired Autos ☐ Non-Owned Autos	XXXXXXXXXX	XX/XX/XX	XX/XX/XX	Combined Single Limit	\$1,000,000
					Bodily Injury (Per Person)	
					Bodily Injury (Per Accident)	
					Property Damage	
	GARAGE LIABILITY ☐ Any Auto				Auto Only - Ea Accident	
					Other Than Auto Only	
					Each Accident	
					Aggregate	
	EXCESS LIABILITY ☐ Umbrella Form ☐ Other Than Umbrella Form				Each Occurrence	
					Aggregate	
	Workers Compensation and Employers' Liability The Proprietor/Partners/Executive Officers Are: ☐ Incl ☐ Excl	XXXXXXXXXX	XX/XX/XX	XX/XX/XX	☐ Statutory Limits	
					Each Accident	\$100,000
					Disease - Policy Limit	\$500,000
					Disease - Each Employee	\$100,000
	OTHER					

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS: ADDITIONAL INSURED - OWNERS, LESSEES, OR CONTRACTORS (FORM B (ISO-2010 10/93) IS INCLUDED, NAMING HOLDER AS ADDITIONAL INSURED. THIS INSURANCE IS PRIMARY, AND OUR OBLIGATIONS ARE NOT AFFECTED BY ANY OTHER INSURANCE CARRIED BY THE ADDITIONAL INSURED WHETHER PRIMARY, EXCESS, CONTINGENT, OR ON ANY OTHER BASIS.

CERTIFICATE HOLDER

COUNTY OF CHARLESTON
ATTN: PROCUREMENT DEPARTMENT
LONNIE HAMILTON, III PUBLIC SERVICES BUILDING
4045 BRIDGE VIEW DRIVE
N. CHARLESTON, SC 29405

CANCELLATION

Should any of the above described policies be canceled before the expiration date thereof, the issuing company will endeavor to mail 30 days written notice to the certificate holder named to the left, but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representative

AUTHORIZED REPRESENTATIVE



**Charleston County Government
Performance Bond**

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

as Principal, hereinafter called Contractor, and, _____
(Insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto Charleston County Government,, 4045 Bridge View Drive, North Charleston, South Carolina 29405, as Obligee, hereinafter called Owner, in the amount of _____
_____ Dollars (\$_____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated _____, 2009, entered into a contract with
Owner for _____
(Insert full name, address and description of project)

in accordance with the Drawings and Specifications prepared by _____
(Insert full name and address or legal title of the Design Professional)

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

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and conditions, or
2. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible

bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion of the Work, but not exceeding the Contract Price excluding other costs and damages for which Surety may be liable hereunder.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this ____ day of _____, 2009.

_____ (Witness)	_____ (Principal) (Seal)
_____ (Witness)	_____ (Title)
	_____ (Surety) (Seal)
	_____ (Title)



**Charleston County Government
Labor and Material Payment Bond**

(This bond is issued simultaneously with Performance Bond in favor of the Owner conditioned on the full and faithful performance of the Contract)

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

as Principal, hereinafter called Principal, and, _____
(Insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto Charleston County Transportation Committee, 4045 Bridge View Drive, North Charleston, South Carolina 29405, as Obligee, hereinafter called Owner, in the amount of _____ Dollars (\$ _____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Principal has by written agreement dated _____, 2009, entered into a contract with
Owner for _____
(Insert full name, address and description of project)

in accordance with the Drawings and Specifications prepared by _____
(Insert full name and address or legal title of the Design Professional)

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

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.
2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:
 - a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the

Owner, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

- b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
 - c) Other than in a nonjury hearing before the Circuit Court for the Ninth Judicial Circuit sitting in Charleston, South Carolina.
4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this ____ day of _____, 2009.

_____ (Witness)	_____ (Principal) (Seal)
_____ (Witness)	_____ (Title)
_____ (Witness)	_____ (Surety) (Seal)
_____ (Witness)	_____ (Title)



STATE OF SOUTH CAROLINA
DEPARTMENT OF REVENUE
**NONRESIDENT TAXPAYER
REGISTRATION AFFIDAVIT
INCOME TAX WITHHOLDING**

ATTACHMENT A

I-312
(Rev. 5/7/04)
3323

The undersigned nonresident taxpayer on oath, being first duly sworn, hereby certifies as follows:

1. Name of Nonresident Taxpayer: _____
2. Trade Name, if applicable (Doing Business As): _____
3. Mailing Address: _____
4. Federal Identification Number: _____
5. _____ Hiring or Contracting with:
 Name: _____
 Address: _____
- _____ Receiving Rentals or Royalties From:
 Name: _____
 Address: _____
- _____ Beneficiary of Trusts and Estates:
 Name: _____
 Address: _____
6. I hereby certify that the above named nonresident taxpayer is currently registered with (check appropriate box):
☐ The South Carolina Secretary of State or
☐ The South Carolina Department of Revenue

Date of Registration: _____

7. I understand that by this registration, the above named nonresident taxpayer has agreed to be subject to the jurisdiction of the South Carolina Department of Revenue and the courts of South Carolina to determine its South Carolina tax liability, including estimated taxes, together with any related interest and penalties.
8. I understand the South Carolina Department of Revenue may revoke the withholding exemption granted under Code Sections 12-8-540 (rentals), 12-8-550 (temporarily doing business or professional services in South Carolina), and 12-8-570 (distributions to nonresident beneficiary by trusts or estates) at any time it determines that the above named nonresident taxpayer is not cooperating with the Department in the determination of its correct South Carolina tax liability.

The undersigned understands that any false statement contained herein could be punished by fine, imprisonment, or both.

Recognizing that I am subject to the criminal penalties under Code Section 12-54-44 (B)(6)(a)(i), I declare that I have examined this affidavit and to the best of my knowledge and belief, it is true, correct and complete.

(Signature of Nonresident Taxpayer (Owner, Partner or Corporate Officer, when relevant) (Seal) _____
Date

If Corporate Officer, state title: _____

(Name - Please Print)

Mail to: The company or individual you are contracting with.

INSTRUCTIONS
NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT

REQUIREMENTS TO MAKE WITHHOLDING PAYMENTS

Code Section 12-8-550 requires persons hiring or contracting with a nonresident taxpayer to withhold 2% of each payment made to the nonresident where the payments under the contract exceed \$10,000. However, this section does not apply to payments on purchase orders for tangible personal property when those payments are not accompanied by services to be performed in this state.

Code Section 12-8-540 requires persons making payment to a nonresident taxpayer of rentals or royalties at a rate of \$1,200 or more a year for the use of or for the privilege of using property in South Carolina to withhold 7% of the total of each payment made to a nonresident taxpayer who is not a corporation and 5% if the payment is made to a corporation.

Code Section 12-8-570 requires trusts or estates making distribution of South Carolina taxable income to a nonresident beneficiary to withhold 7% of the beneficiary's distribution which is attributable to South Carolina taxable income.

PURPOSE OF AFFIDAVIT

A person is not required to withhold taxes with regard to any nonresident taxpayer who submits an affidavit certifying that it is registered with either the South Carolina Secretary of State or the South Carolina Department of Revenue.

Our Internet address is: **www.sctax.org**

Charleston County
Drug-free Workplace Certification
(Contractor/Vendor Other Than Individuals)

This certification is required by the Drug-free Workplace Act, Section 44-107-10 et seq South Carolina Code of Laws (1976, as amended). The regulations require certification by Contractors/Vendors prior to award, that they will maintain a drug-free workplace as defined below. The certification set out below is a material representation of fact upon which reliance will be placed when determining the award of a contract. False certification or violation of the certification shall be grounds for suspension of payments, suspension or termination of contract, or suspension or debarment from the right to submit bids or proposals for Charleston County projects.

For purposes of this Certification, "Drug-free Workplace" is defined as set forth in Section 44-107019 (1), South Carolina Code of Laws (1976, as amended). The aforesaid Section defines workplace to include any site where work is performed to carry out the Contractor's/ Vendor's duties under the contract. Contractor's/Vendor's employees shall be prohibited from engaging in the unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance in accordance with the requirements of the Drug-free Workplace Act.

By signing this document, the Contractor/Vendor hereby certifies that it will provide a drug-free workplace by:

- (1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the Contractor's/Vendor's workplace and specifying the actions that will be taken against employees for violation of the prohibition;
- (2) Establishing a drug-free awareness program to inform employees about:
 - (a) The dangers of drug abuse in the workplace;
 - (b) The Contractor's/Vendor's policy of maintaining a drug-free workplace;
 - (c) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (d) The penalties that may be imposed upon employees for drug violations;
- (3) Making it a requirement that each employee to be engaged in the performance of the contract be given a copy of the statement required by paragraph (1) above;
- (4) Notifying the employee in the statement required by paragraph (1) that, as a condition of employment under the contract, the employee will:
 - (a) Abide by the terms of the statement, and
 - (b) Notify the employer of any criminal drug statue conviction for a violation occurring in the workplace no later than five (5) days after the conviction;

- (5) Notifying the using agency within ten (10) days after receiving notice under subparagraph (4) (b), from an employee or otherwise receiving actual notice of the conviction;
- (6) Taking one of the following actions, within thirty (30) days of receiving notice under subparagraph (4) (b) with respect to any employee who is convicted:
 - (a) Taking appropriate personnel action against the employee, up to and including termination; and
 - (b) Requiring the employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;
- (7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (1), (2), (3), (4), (5), and (6) above.

CHARLESTON CO. CONTRACT NO.: **CONTRACTOR/VENDOR:**

4376

Print Name and Address of Business:

Project:

SC 61 at Tobias Gadson

WITNESSETH:

Signature of Authorized Agent

Print Name and Title:

Date: _____

Note: This certification form is required for all contracts for a stated or estimated value of \$50,000 or more

ATTACHMENT E

REQUIRED FORMS

BID FORM
Page One

BY SUBMITTING THIS BID, THE UNDERSIGNED BIDDER REPRESENTS:

1. The Bidder has carefully examined the plans and specifications with the related documents and visited the site of the Project for which he is submitting a bid.
2. The Bidder is familiar with all the conditions surrounding the performance of the Work required for this Project, including the availability of materials, equipment, supplies and labor, and has visited the site and is therefore familiar with all physical conditions affecting the Work and has considered same in calculating its bid.
3. If the Bidder is awarded the Contract, he will provide all labor, material, supplies and equipment and execute the Work in accordance with the Contract Documents.
4. If the Bidder is awarded the Contract, Bidder will commence Work after the issuance of a "Notice to Proceed" as required in the Invitation for Bids.
5. If the Bidder awarded the Contract, Bidder agrees that if the Work or any part thereof is not completed according to the specifications and terms of the Contract Documents and within the Contract Time (including any extension thereof), its sureties will be liable for Liquidated Damages in accordance with the Contract.
6. The Bidder will hold its bid open for sixty (60) calendar days after the date bids are opened or else will forfeit the bid security to the County.
7. If the Bidder is awarded the Contract, he will provide a performance bond and a payment bond (Charleston County labor and material bond and performance bond) together with insurance coverage as required by the Invitation for Bids. The costs of the bonds and insurance are included in the bid.
8. The Bidder understands that the County reserves the right to reject any bids which do not meet the bid requirements or all bids in the event that the Project is canceled or postponed, or if such is in the best interests of the County.
9. That if awarded the Contract the successful Bidder will enter and execute a contract as required in the Invitation for Bids.
10. That the Bidder is legally able to enter into and perform a contract, if awarded.
11. That the Bidder is current on all taxes and fees owed to the County.

BID FORM**Page Two**

The undersigned hereby offers to furnish all materials and supplies, tools, barriers, equipment, labor, subtrade costs, supervision, clean up and other costs, without exception, in accordance with the plans, specifications, drawings, and Contract Documents for Invitation for Bids No. 4376-10L.

TIME OF COMPLETION:

The undersigned agrees to commence Work upon issuance of a Notice to Proceed with an adequate force, carry the Work forward as rapidly as possible, and complete the Project as required by the Invitation for Bids. Completion of this Project shall be achieved within ***ninety (90)*** calendar days from the date of issuance of the Notice to Proceed.

EXECUTION OF THE CONTRACT:

The undersigned further agrees that in the case of failure or refusal on its part to execute the Contract within five (5) business days after the issuance of a Notice of Award, the check, cash, or bid bond accompanying this bid shall be paid into the funds of the County's account set aside for this Project, as liquidated damages, and not as a penalty, for such failure; otherwise the check, cash, or bid bond accompanying this bid shall be returned to the undersigned. Please note that the Contract must be executed in Charleston, South Carolina.

BID PRICES:

The unit price per ton, square yard, linear foot, etc., must reflect all materials, supplies, equipment, supervision, labor costs, quality control services, and sales tax necessary to complete the Project. All costs for grading, sweeping, cleaning, shaping, tacking, compacting, etc., shall also be included in the unit bid price.

The total base bid will be considered in determining the Award of Contract pursuant to Paragraph Five (5) of this IFB.

Charleston County reserves the right to increase the Contract quantities by an amount not to exceed in value twenty percent (20%) of the total Contract amount, or decrease the Contract quantities by an amount not to exceed in value twenty percent (20%) of the total Contract amount. Any increase in quantity will be on other streets or in the same general area of Work. Payment will be made based on the unit bid prices shown on the successful bidders Bid Form(s) and incorporated by reference in the Contract. See the attached Contract for additional terms regarding payment for adjustments in quantities, and other adjustments to the Contract.

BID FORM
Page Three

NOTE: THE QUANTITIES LISTED HEREIN ARE ESTIMATES ONLY AND DO NOT CONSTITUTE ANY WARRANTY OR GUARANTEE BY THE COUNTY, AND SHOULD NOT BE RELIED UPON BY BIDDERS. ALL QUANTITIES MAY VARY. THE TOTALS REQUIRED ON THE BID FORM HEREIN ARE FOR INFORMAL COMPARISON ONLY. PAYMENTS WILL BE BASED UPON UNIT PRICES.

Ashley River Road (SC 61) at Tobias Gadson Boulevard

Item Number	Description of Item	Unit	Quantity	Unit Price	Total Price
1031000	MOBILIZATION	LS	NEC.	\$	\$
1050800	CONSTRUCTION STAKES, LINES & GRADES	EA	1.000	\$	\$
1071000	TRAFFIC CONTROL	LS	NEC.	\$	\$
1090200	AS-BUILT CONSTRUCTION PLANS	LS	NEC.	\$	\$
2012000	CLEARING & GRUBBING WITHIN ROADWAY	LS	NEC.	\$	\$
2021005	REMOVAL & DISPOSAL OF EXISTING CATCH BASIN	EA	4.000	\$	\$
2023000	REMOVAL & DISPOSAL OF EXISTING PAVEMENT	SY	7.000	\$	\$
2025000	REMOVAL & DISPOSAL OF EXISTING ASPHALT PAVEMENT	SY	147.000	\$	\$
2031000	UNCLASSIFIED EXCAVATION	CY	168.000	\$	\$
2033000	BORROW EXCAVATION	CY	50.000	\$	\$
2081001	FINE GRADING	SY	678.000	\$	\$
2103000	FLOWABLE FILL	CY	100.000	\$	\$
3069900	MAINTENANCE STONE	TON	20.000	\$	\$
3100320	HOT MIX ASPHALT BASE COURSE - TYPE B	TON	117.000	\$	\$
4011004	LIQUID ASPHALT BINDER PG64-22	TON	10.000	\$	\$
4013990	MILL EXISTING ASPH. PVMT-VARIABLE	SY	250.000	\$	\$
4020330	HOT MIX ASPHALT INTERMEDIATE COURSE TYPE C	TON	44.000	\$	\$

BID FORM
Page Four

<i>Item Number</i>	<i>Description of Item</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total Price</i>
4030340	HOT MIX ASPHALT SURFACE COURSE TYPE C	TON	43.000	\$	\$
6051120	PERMANENT CONSTRUCTION SIGNS (GROUND MOUNTED)	SF	252.000	\$	\$
6250005	4" WHITE BROKEN LINES - (GAPS EXCLUDED)- FAST DRY PAINT	LF	132.000	\$	\$
6250010	4" WHITE SOLID LINES (PVT.EDGE LINES)- FAST DRY PAINT	LF	160.000	\$	\$
6250015	8" WHITE SOLID LINES (CROSSWALK & CHANNELIZATION) FAST DRY PAINT	LF	300.000	\$	\$
6250025	24" WHITE SOLID LINES (STOP/DIAGONAL LINES) – FAST DRY PAINT	LF	120.000	\$	\$
6250030	WHITE SINGLE ARROW (LEFT, STRAIGHT, RIGHT) -FAST DRY PAINT	EA	2.000	\$	\$
6250035	WHITE WORD MESSAGE- "ONLY" - FAST DRY PAINT	EA	2.000	\$	\$
6271005	4" WHITE BROKEN LINES (GAPS EXCL.) THERMOPLASTIC- 90 MIL.	LF	84.000	\$	\$
6271010	4" WHITE SOLID LINES (PVT. EDGE LINES) THERMO. - 90 MIL.	LF	80.000	\$	\$
6271015	8" WHITE SOLID LINES THERMOPLASTIC - 125 MIL.	LF	150.000	\$	\$
6271025	24" WHITE SOLID LINES (STOP/DIAGONAL LINES) – THERMO. – 125 MIL	LF	60.000	\$	\$
6271030	WHITE SIGNLE ARROWS (LT, STRAIGHT, RT) THERMO. - 125 MIL.	EA	2.000	\$	\$
6271035	WHITE WORD MESSAGE "ONLY" - THERMO. - 125 MIL.	EA	2.000	\$	\$
6300005	PERMANENT CLEAR PAVEMENT MARKERS - MONO-DIR. 4"X4"	EA	3.000	\$	\$
6513015	MOUNTING ASSEMBLY FOR F.S. SIGN ERCTD ON SPAN WIRE	EA	1.000	\$	\$
6531210	U-SECTION POST FOR SIGN SUPPORTS - 3P	LF	15.000	\$	\$
675027C	3.0" SCHEDULE 80 PVC CONDUIT	LF	20.000	\$	\$
6750275	1.0" SCHEDULE 80 PVC CONDUIT	LF	580.000	\$	\$
6750278	2.0" SCHEDULE 80 PVC CONDUIT	LF	40.000	\$	\$
6770388	NO. 14 COPPER WIRE, 4 CONDUCTOR – BLACK	LF	210.000	\$	\$
6770389	NO. 14 COPPER WIRE, 4 CONDUCTOR – GREY	LF	484.000	\$	\$
6770393	NO. 14 COPPER WIRE, 8 CONDUCTOR – BLACK	LF	610.000	\$	\$
6770394	NO. 14 COPPER WIRE, 8 CONDUCTOR – GREY	LF	610.000	\$	\$

BID FORM
Page Five

<i>Item Number</i>	<i>Description of Item</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Total Price</i>
6770413	NO. 14 COPPER WIRE, 1-CONDUCTOR FOR LOOP WIRE	LF	409.000	\$	\$
6770460	ELECTRICAL COMMUNICATIONS CABLE – UNDERGROUND – 6 PAIR	LF	300.000	\$	\$
6780495	SAWCUT FOR LOOP DETECTOR	LF	167.000	\$	\$
6800500	MOD. EXIST ELECTRICAL SERVICE FOR TRAFFIC SIGNAL	EA	1.000	\$	\$
6800518	13"X24"X18" D.ELEC. FLUSH ENDGRD. ENCLOSURE – (STR. POLY. CONC.) HD	EA	3.000	\$	\$
6825020	35' WOOD POLE – CLASS II – CCA TREATED (0.60)	EA	1.000	\$	\$
6825045	3/8" BACK GUY FOR WOOD POLE	EA	2.000	\$	\$
6825090	1/4" GALVANIZED STEEL CABLE	LF	224.000	\$	\$
6825092	3/8" GALVANIZED STEEL CABLE	LF	224.000	\$	\$
6825484	10' BREAK-AWAY ALUMINUM PEDESTAL POLE	EA	1.000	\$	\$
6845523	CONTROLLER, 8 PH, IN TYPE 4 BASE MTD CAB – W/ COORD	EA	1.000	\$	\$
6845661	LOOP DETECTOR AMPLIFIER W/ HARNESS – 2 CHANNEL W/DEL/EXT TIMING	EA	1.000	\$	\$
6865710	12" 1-WAY-5 SECTION (R.Y.YA.G.GA.) VEHICLE TRAFFIC SIGNAL	EA	1.000	\$	\$
6865731	12" 1-WAY-3 SECTION (R.Y.G.) VEHICLE TRAFFIC SIGNAL	EA	3.000	\$	\$
6865780	1-WAY-1 SECT. HAND/MAN EMBLEM PEDESTRIAN SIGNAL HEAD	EA	2.000	\$	\$
6865792	PEDESTRIAN PUSH BUTTON AND SIGN (CUSTOM MESSAGE)	EA	2.000	\$	\$
6865830	VEHICLE TRAFFIC SIGNAL HEAD MOUNTING ASSEMBLY FOR SPAN WIRE	EA	4.000	\$	\$
6865840	PEDESTRIAN TRAF. SIGNAL HEAD MOUNTING ASSEMBLY FOR POST TOP	EA	1.000	\$	\$
6865841	PEDESTRIAN TRAF. SIGNAL HEAD MOUNTING ASSEMBLY FOR SIDE POLE	EA	1.000	\$	\$
6885990	REMOVAL, SALVAGE, & DISP. OF EXISTING TRAF. SIGNAL EQUIPMENT	LS	NEC.	\$	\$
6885992	TEMPORARY ADJUSTMENT OF TRAFFIC SIGNAL EQUIPMENT	LS	NEC.	\$	\$
6886010	INTEGRATION	LS	NEC.	\$	\$
6888225	INSTALL CONTROLLER – BASE MOUNTED CABINET	EA	1.000	\$	\$
6888300	INSTALL SPAN WIRE MOUNT VEHICLE TRAFFIC SIGNAL	EA	4.000	\$	\$
7141162	18" RC PIPE CUL.-CLASS III – AASHTO M315 JOINT	LF	244.000	\$	\$
7149999	CLEANING EXISTING PIPE	LF	120.000	\$	\$

BID FORM**Page Six**

Item Number	Description of Item	Unit	Quantity	Unit Price	Total Price
7191605	CATCH BASIN - TYPE 16	EA	3.000	\$	\$
7192020	DROP INLET (24"X36")	EA	3.000	\$	\$
7192105	MANHOLE	EA	1.000	\$	\$
7192240	36" X 36" JUNCTION BOX	EA	1.000	\$	\$
7203210	CONCRETE CURB AND GUTTER (2' – 0")	LF	324.000	\$	\$
7204100	CONCRETE SIDEWALK(4" UNIFORM)	SY	116.000	\$	\$
7204900	DETECTABLE WARNING SURFACE	SF	47.000	\$	\$
7205000	CONCRETE DRIVEWAY (6" UNIFORM)	SY	24.000	\$	\$
8081001	MOVING ITEM NO. 1 (CORBETT'S APPLIANCE REPAIRS SIGN)	LS	NEC.	\$	\$
8090050	RIGHT- OF- WAY REPORT	LS	NEC.	\$	\$
8091010	RIGHT-OF-WAY MARKER (REBAR & CAP)	EA	4.000	\$	\$
8100100	PERMANENET COVER	ACRE	0.042	\$	\$
8100200	TEMPORARY COVER	ACRE	0.021	\$	\$
8101110	STRAW OR HAY MULCH WITH TACKIFIER	ACRE	0.063	\$	\$
8104005	FERTILIZER (NITROGEN)	LB	5.000	\$	\$
8104010	FERTILIZER (PHOSPHORIC ACID)	LB	5.000	\$	\$
8104015	FERTILIZER (POTASH)	LB	5.000	\$	\$
8105005	AGRICULTURAL GRANULAR LIME	LB	84.000	\$	\$
8109901	MOWING	ACRE	0.120	\$	\$
8152004	INLET STRUCTURE FILTER – TYPE F (WEIGHTED)	LF	16.000	\$	\$
8152006	INLET STRUCTURE FILETER – TYPE F (NON-WEIGHTED)	LF	16.000	\$	\$
8153000	SILT FENCE	LF	363.000	\$	\$
8154010	CLEANING SILT BASINS	CY	17.000	\$	\$
8156210	INLET STRUCTURE FILTER - TYPE B	EA	3.000	\$	\$
				Total Project Cost	\$

BID FORM
Page Seven**Co-Permittee Agreement & Contractor Certification**

Project Name: _____

Permit Number: _____

All contractors and subcontractors identified in the plan as Co-Permittees must sign a copy of the certification statement given below:

"I certify by my signature below that: a) for Sites that disturb 10 or more acres, I participated in a pre-construction conference onsite or, when allowed, offsite with the individual who is responsible for the operational control of the Storm Water Pollution Prevention Plan (SWPPP); and b) I accept the terms and conditions of SWPPP as required by the general National Pollutant Discharge Elimination System (NPDES permit number SCR100000) issued to the Owner/Operator of the construction activity for which I have been contracted to perform construction related professional services. Further, by my signature below, I understand that I am becoming a Co-Permittee with the Owner/Operator and other contractors that have become Co-Permittees to the general NPDES permit issued to the Owner/Operator of the facility for which I have been contracted to perform professional construction services. As a Co-Permittee, I understand that I, and my company, as the case may be, am legally accountable to the SC Department of Health and Environmental Control (DHEC), under the authorities of the CWA and the SC Pollution Control Act, to ensure compliance with the terms and conditions of the SWPPP. I also understand that DHEC enforcement actions may be taken against any specific Co-Permittee or combination of Co-Permittees if the terms and conditions of the SWPPP are not met. Therefore, having understood the above information, I am signing this certification and am receiving Co-Permittee status to the aforementioned general NPDES permit."

Contractor Rep.: _____

Signature: _____ Date: _____

Title: _____

Company Name: _____

Address: _____

City/State/Zip: _____

Phone: _____

Bidder: _____

IFB NO. 4376-10L

BID FORM
Page Eight

BID SECURITY

Amount Enclosed (5% of Bid) \$ _____ (Bid Bond or Cashier's Check)

BID HOLDING TIME:

Prices must remain firm for a minimum of sixty (60) business days from bid closing. Please indicate maximum time that bid prices will remain firm.

Prices firm through: _____

CHARLESTON COUNTY TAXES:

Please note that the Procurement Department is required to verify that all taxes have been paid to the County. If you owe delinquent taxes, your bid may be disqualified from consideration. If you wish to inquire as to your tax status, you may contact the Charleston County Delinquent Tax Office Department at (843) 958-4570.

BUSINESS LICENSE:

Does your business have a valid Charleston County Business License? ☐ Yes ☐ No

If so, list the number _____. You must possess a valid Charleston County Revenue Collections for business undertaken in the unincorporated areas of the County. Contact the Charleston County Revenue Collections/User Fee Department at (843) 958-4880 with any questions.

Note: Work performed inside the corporate limits of a municipality will also necessitate a business license for that municipality.

Is your firm a _____ Partnership, _____ Corporation, _____ Sole Proprietorship?
If incorporated, please list state of incorporation: _____

SMALL BUSINESS ENTERPRISE (SBE) PROGRAM

Charleston County Council has amended its Procurement Ordinance to include a mandatory Small Business Enterprise (SBE) subcontract requirement on most procurements and contracts. See Attachment E, Required Forms, for details on the requirement for this project.

CHARLESTON COUNTY DISADVANTAGED BUSINESS GOAL

Charleston County Council has established a goal of 20% for Disadvantaged Business Enterprise (DBE) participation. This goal is in addition to the Small Business Enterprise (SBE) Program requirements.

BUSINESS OWNERSHIP CERTIFICATION

Are you a certified Charleston County Small Business Enterprise (SBE)? ☐ No ☐ Yes

(If yes, give SBE Certification No. _____)

Is at least 51% of this business: ☐ Minority Owned? ☐ Woman Owned?

☐ White Male	____%	☐ Hispanic/Latino Male	____%	☐ American Indian/Alaskan Native Male	____%
☐ White Female	____%	☐ Hispanic/Latino Female	____%	☐ American Indian/Alaskan Native Female	____%
☐ Black Male	____%	☐ Asian Male	____%	☐ Native Hawaiian/Pacific Islander Male	____%
☐ Black Female	____%	☐ Asian Female	____%	☐ Native Hawaiian/Pacific Islander Female	____%

Is your firm a _____ Corporation, _____ Sole Proprietorship, or _____ Partnership?
If incorporated, please list state of incorporation: _____

Bidder: _____

IFB NO. 4376-10L

BID FORM
Page Nine

LOCAL VENDOR PREFERENCE OPTION:

My company meets the requirements and wishes to request the local vendor preference.

☐ No ☐ Yes

Respectfully submitted this ____ day of _____, 2009

Company Name _____

Authorized Signature _____

Name and Title (type or print) _____

Principal of Company (e.g., Name of President, General Partner, Owner, etc.) _____

State of Incorporation _____

Business Address _____

City, State, Zip Code _____

() _____ () _____
Telephone Number Fax Number

Email Address: _____

Contractor's Federal Tax I.D. No. _____

S.C. Contractor's License No. _____

SMALL BUSINESS ENTERPRISE (SBE) PROGRAM

NOTICE: There is a mandatory subcontract requirement on this project. Failure to complete and return the attached two-page SBE form will result in your submittal being deemed “non-responsive.”

The mandatory subcontract requirement for this contract is **12.2% of the total bid amount.**

See attached forms for full details



Small Business Enterprise (SBE) Program
How to Complete the Mandatory SBE Subcontract Requirement Form

This form must be completed and included with your response.
Failure to comply will result in the Bidder/Offeror being deemed non-responsive.

*Charleston County Council unanimously passed a Small Business Enterprise (SBE) Program Ordinance in 2007, which requires **mandatory** subcontract requirements for solicitations expected to be at least \$25,000. The Contract percentage required is stated on the **Mandatory** SBE Subcontract Requirement Form (see Page 2). **Under certain circumstances (such as when there are no SBEs certified in the business category required for the Contract), the mandatory subcontract requirement will be stated as 0%, and the prime will then be required to make a good faith effort to locate and subcontract with non-certified small businesses on the project. Details of the good faith effort requirement are stated in Section B of the form.***

▪ **If the prime contractor is itself a certified SBE, the mandatory subcontract requirement becomes voluntary (prime must still complete and submit the form (Page 2)).**

▪ Charleston County Procurement will attach a **Mandatory** SBE Subcontract Requirement Form to any solicitation which is expected to be at least \$25,000. **If the properly completed **Mandatory** SBE Subcontract Requirement Form is not attached, your submittal will be deemed non-responsive and will not be considered.**

▪ The percentage requirement is specific to the solicitation and applies to any change orders, additional services, modifications, or revisions to the original proposal. A listing of Certified SBEs is available on the County's Website at www.charlestoncounty.org/SBE or by calling the Procurement Department at 843.958.4750. Businesses certified as DBEs by the South Carolina Department of Transportation (SCDOT) may also be counted toward the subcontract requirement provided their gross annual income does not exceed \$7.5 million as averaged over the previous three years and as verified by federal tax returns for that period. Income will be verified prior to contract award.

▪ If a 0% requirement is stated for the solicitation, and the prime is not itself a certified SBE, the prime is required to make a good faith effort to locate and utilize non-certified small business enterprises on the project. The prime must document the effort in Section B of the **Mandatory** SBE Subcontract Requirement Form (Page 2). **Failure to correctly complete Section B on Page 2 will result in the submittal being considered non-responsive.**

▪ A vendor or subcontractor does not have to be a certified SBE to participate in the County's contracting and purchasing activities. However, it is our goal to attempt to certify any vendor or subcontractor who may qualify. Information on how to become certified as an SBE and the one-page application form can be accessed at www.charlestoncounty.org/SBE or by calling the Procurement Department at 843.958.4750.

▪ A Bidder/Offeror may not apply one of its own subsidiary companies or its own workforce toward meeting the **mandatory** SBE subcontract requirement unless the Bidder/Offeror is itself a certified Charleston County SBE. In that event, the work performed by the prime contractor/vendor will be counted toward the requirement, and the **mandatory** subcontract requirement becomes voluntary.

▪ The contractor will maintain records showing: subcontractor/supplier awards, subcontractor payment history, specific efforts to identify and award contracts to SBEs, and copies of executed contracts with SBEs. The contractor may be required to provide access to books, records, and accounts to authorized officials of the County for verification purposes. All County contracts are subject to SBE audit.

▪ Properly documented appeals to the subcontract requirement may be submitted to the Contracts and Procurement Director in accordance with the provisions of *Charleston County Procurement Ordinance, Division 7, Legal and Contractual Remedies*. The Procurement Ordinance is available online at www.charlestoncounty.org, or by calling the Procurement Department at 843.958.4750.



**Small Business Enterprise (SBE) Program
Mandatory SBE Subcontract Requirement Form**

**This form must be completed and included with your response.
Failure to comply will result in the Bidder/Offeree being deemed non-responsive.**

***The mandatory subcontract requirement for this contract is 12.2% of the total bid amount.**

Name of prime contractor firm _____

*If the prime is itself a certified Charleston County SBE, the above goal becomes voluntary.

Is your business a certified Charleston County SBE? ☐ No ☐ Yes

If yes, sign here: _____

If you checked "yes," you are not required to complete the rest of this form; however, your voluntary completion and good faith effort is encouraged.

Section A Complete this section **ONLY** if there is a **mandatory** percentage requirement stated above and the prime is NOT itself a certified SBE. All other primes must list all subcontractors that you intend to be counted toward the percentage requirement. To be counted toward the requirement, the subcontractor must be a Charleston County certified SBE. Firms certified as DBEs by the South Carolina Department of Transportation (SCDOT) can be counted toward the goal provided their gross annual income does not exceed \$7.5 million as averaged over the previous three years. Income will be verified prior to contract award.

			Total Bid Amount	
Name of Small Business	Contact Person & Phone No.	Charleston County SBE Certification No. <i>(if DBE, attach certificate)</i>	Estimated \$ Amount of Subcontract	Estimated % of Total Bid

Section B Complete this section **ONLY** if there is a **0% requirement stated above**. If the prime is itself a certified SBE, this section becomes voluntary. All others must list any small businesses (whose annual gross revenues are believed not to exceed \$7.5 million) that you have contacted as a subcontractors for this contract. Charleston County Procurement will contact these firms to attempt to certify them as SBEs. Fulfillment of this requirement constitutes a good faith effort on your part **AND IS MANDATORY. Failure to comply with and fully document this section will result in a submittal being deemed non-responsive.**

Name of Small Business	Contact Person & Phone No.	Service/Supplies to be Provided by Subcontractor	Estimated \$ Amount of Subcontract	Estimated % of Total Bid

Bidder: _____

IFB NO. 4376-10L

NOTE FOR IFBs: COMPLETE THIS FORM AND RETURN IT WITH YOUR RESPONSE. SUBSTITUTIONS FOR THIS FORM ARE NOT ACCEPTABLE.

SUBCONTRACTOR DATA FORM

Use this form to list all subcontractors to be used on this project.

Attach additional copies of this form if needed. Substitutions for this form are not acceptable.

Prime Contractor: _____ City & State _____ Phone: __ (____) _____

Form Prepared by: _____ Title: _____ Date: _____ Total Bid Amount \$ _____

Sub's Name, Address, Phone and Principal	Short Description of Goods or Services to be Provided by Subcontractor	Subcontractor's Required License Number(s) (*See note below)	Indicate if Multiple Ownership is <i>Less Than 51%</i> for any Controlling Interest	Indicate if Ownership is <i>at Least 51%</i>	Indicate if Ownership is <i>at Least 51%</i>	Dollar Amount of Subcontract	Subcontract Percentage of Total Bid Amount
			☐ Publicly Traded Co. ☐ No Controlling Interest Owns More Than 50%	☐ Male ☐ Female	☐ Asian American ☐ Black American ☐ Hispanic American ☐ Native American ☐ Pacific Islander ☐ White American		
			☐ Publicly Traded Co. ☐ No Controlling Interest Owns More Than 50%	☐ Male ☐ Female	☐ Asian American ☐ Black American ☐ Hispanic American ☐ Native American ☐ Pacific Islander ☐ White American		
			☐ Publicly Traded Co. ☐ No Controlling Interest Owns More Than 50%	☐ Male ☐ Female	☐ Asian American ☐ Black American ☐ Hispanic American ☐ Native American ☐ Pacific Islander ☐ White American		
			☐ Publicly Traded Co. ☐ No Controlling Interest Owns More Than 50%	☐ Male ☐ Female	☐ Asian American ☐ Black American ☐ Hispanic American ☐ Native American ☐ Pacific Islander ☐ White American		

*List all licenses required for the subcontractor to conduct business in the state of South Carolina.

Compliance with Illegal Immigration Act

By signing a bid/proposal, the Bidder/Offeror certifies that it will comply with the applicable requirements of Title 8, Chapter 14 of South Carolina Code of Laws and agree to provide to the State upon request any documentation required to establish either; (a) that Title 8, Chapter 14 is inapplicable to the Bidder/Offeror and its subcontractors or sub-subcontractors; or (b) that the Bidder/Offeror and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14.

Pursuant to Section 8-14-60, “A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the Court or imprisoned for not more than five years, or both.”

Bidder/Offeror agrees to include in any contracts with subcontractors, language requiring subcontractors to (a) comply with applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-contractors language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14.

Charleston County Contract Number: 4376

Project Name: SC 61 at Tobias Gadson

Contractor/Vendor Name: _____

Address: _____

Authorized Representative Name and Title: _____

Signature of Authorized Representative: _____

Witness (Print Name and Sign): _____

NON-COLLUSION OATH

COUNTY OF: _____

STATE OF: _____

Before me, the Undersigned, a Notary Public, for and in the County and State aforesaid, personally appeared _____ and made oath that the Bidder herein, its agents, servants, and/or employees, to the best of its knowledge and belief, have not in any way colluded with anyone for and on behalf of the Bidder, or themselves, to obtain information that would give the Bidder an unfair advantage over others, nor have they colluded with anyone for and on behalf of the Bidder, or themselves, to gain any favoritism in the award of the Contract herein.

SWORN TO BEFORE ME THIS

_____ DAY OF _____, 2009

NOTARY PUBLIC FOR THE

STATE OF _____

My Commission Expires: _____

Print Name: _____

Address: _____

Phone Number: _____

Authorized Signature for Bidder

Please print Bidder's name and address:

(Note: Notary seal required for Out of State Bidder)

Equal Employment Opportunity Certification

(For Contractors/Vendors Other Than Individuals)

Charleston County requires compliance with State and Federal regulations governing Equal Employment Opportunity, External Equal Opportunities (EO), External On-the-Job Training (OJT), Title VI, and the Americans with Disabilities Act (ADA) programs.

Sub-recipients of federal-aid contracts must include notifications in all solicitations for bids of work or material and agreements subject to Title VI of the Civil Rights Act of 1964 and other nondiscrimination authorities. Sub-recipients, contractors and subcontractors may not discriminate in their employment practices or in the selection and retention of any subcontractor.

By signing this document, the Contractor/Vendor hereby certifies their commitment to assure nondiscrimination in its programs and activities to the effect that no person shall on the grounds of race, color, national origin, sex, age, disability or income status be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination or retaliation under any federally or non-federally funded program or activity administered by the sub-recipient and/or its contractors.

Charleston County Contract Number: 4376

Project Name: SC 61 at Tobias Gadson

Contractor/Vendor Name: _____

Address: _____

Authorized Representative Name and Title: _____

Signature of Authorized Representative: _____

Witness (Print Name and Sign): _____