SPARTANBURG SCHOOL DISTRICT SEVEN

CYPRESS CREEK STORM DRAIN PROJECT

JUNE 8, 2020

TECHNICAL SPECIFICATIONS

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SECTION 01

General Provisions

01-01 INTENT AND SCOPE OF PLANS AND SPECIFICATIONS: It is the intent of the plans and specifications that one shall supplement the other, but not necessarily duplicate one another. Any work called for in one and omitted in the other shall be executed as if called for in both in order that the work be fully completed according to the complete design as determined by the Consulting Engineer (Engineer) and approved by the Owner Project Manager. Should any discrepancy appear in or between the drawings and specifications, the specifications will govern. It is to be understood that the work described in the specifications and shown on the plans shall be complete in every detail whether every necessary item is particularly mentioned or not and the Contractor shall be held to provide all items of labor and materials necessary for the satisfactory completion of the indicated work. Any provisions contained in the specifications or shown on the standard drawings which are not applicable to the work pertaining to this project shall be disregarded. All testing shall be accomplished in accordance to these specifications and only at the discretion of the Regulatory Authority shall any portions of the testing be waived.

A. The Contractor shall check all dimensions, elevations, quantities and instructions shown on the plans or given in the specifications and shall notify the Engineer should any discrepancy of any kind be found in the plans, specifications or conditions at the site. He will not be allowed to take advantage of any discrepancy, error or omissions. If any discrepancy is discovered, the Engineer with Owner's approval will issue full instructions pertaining thereto and the Contractor shall carry out these instructions as if originally specified.

B. The Specifications are divided into Sections for convenience of reference. The materials, work, etc., mentioned or specified in one part are not intended to be limited to that part only, but shall be applied with equal force to any other part or division of work where such materials, work, equipment, etc., are mentioned or required to properly provide for acceptable work according to the true intent of the drawings and specifications. Reference to standard specifications (ASTM, AWWA, ANSI, etc.), national codes, local or state codes and laws and ordinances shall mean the latest edition of said document in effect at the time of taking bids unless specifically stated otherwise.

C. Drawings shall be followed in construction of the work and all dimensions and elevations shown on the Plans shall be accurately maintained. Scaled measurements will not be allowed and no work shall be performed when dimensions or elevations are not indicated until such dimensions or elevations are obtained from the Engineer.

01-02 MATERIALS AND WORKMANSHIP: It is the intent of these Specifications that the Contractor shall furnish first-class materials and do all work in a first-class manner so that the completed job shall be thoroughly satisfactory in every respect. To this end, the Contractor shall utilize all of his construction experience and shall consult with the Engineer regarding items in the Plans and Specifications which may be altered to the benefit of the work.

A. Materials, Services and Facilities: It is understood that except as otherwise specifically stated in the specifications, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete and deliver the work within the specified time.

Materials must be approved for use before being purchased by the Contractor. The Contractor shall submit to the Engineer a list of such materials or products, and the shop drawings, together with such samples as may be necessary for determination of their acceptability and obtain material/product approval. No request for payment will be approved until this list has been received and approved by the Owner. Delay caused by obtaining approvals for substitute materials will not be considered justifiable grounds for an extension of construction time.

B. Shop Drawings: Shop Drawings are original drawings prepared by the Contractor, or a subcontractor or supplier, which illustrate some portion of the work and show fabrication, layout, and setting or erection details. Shop drawings shall also include manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data, as required. Shop drawings shall be clearly marked to identify specific materials, finishes, products or models, and shall show all required dimensions and clearances, performance characteristics and capacities, wiring diagrams and controls.

1) The Contractor shall review and check all shop drawings for accuracy and conformance with the contract documents. The Contractor's review shall include verifying field measurements, field construction criteria, dimensions, catalog numbers and similar data. Prior to submission to the Engineer, all shop drawings shall be marked, stamped or otherwise certified as approved by the Contractor, dated and signed or initialed. Any shop drawings not so marked will be returned to the Contractor without the Engineer's review.

2) Contractor shall schedule the submission of shop drawings to allow sufficient time for review by the Engineer and the Owner, corrections and resubmissions by the Contractor, and re-checking by the Engineer/Owner, as necessary. The Engineer will review shop drawings within two (2) weeks from date received.

3) A minimum of two (2) copies of each submittal indicating approval by the

Engineer shall be submitted to the Owner.

4) The Contractor shall not begin fabrication or work which requires Submittals until return of submittals with the full approval.

01-03 MATERIAL INSPECTION AND TESTING: All materials and equipment used in the construction of this project shall be subject to adequate inspection and testing, in accordance with requirements and accepted standards. All testing shall be done after fabrication and performed within the continental limits of the United States.

A. Materials of construction, particularly those upon which the strength and durability of the structure may depend, shall be subject to inspection and testing to establish conformance with specifications and suitability for uses intended.

B. Laboratory or Inspection Agencies shall be selected, or approved, by the Owner and Engineer. Preparation of test samples and shipment to an independent laboratory shall be by the Contractor. The Contractor will pay for all tests and reports, except those which may be specifically excluded by other sections of the specifications.

01-04 PRE-CONSTRUCTION CONFERENCE:

A. Upon SCDHEC construction permit issuance, the Consulting Engineer shall contact the Owner to schedule a preconstruction conference. The conference shall be scheduled no less than three (3) days in advance.

B. The conference shall be attended by:
- Owner's Project Manager
- Representative of Consulting Engineer
- Representative of the Contractor and/or the Contractor's Project Foreman
- Representative of any Subcontractors involved with project
- Representative of Country Erosion Control

At least two (2) days prior to the preconstruction conference, the Consulting Engineer shall provide the Owner with four sets of plans and specifications stamped "Issued for Construction". Project cut sheets and applicable shop drawings shall be provided as soon as possible after the preconstruction conference and prior to starting construction.

01-05 INSPECTION: The Engineer shall provide for the inspection of all materials used and all work done under these specifications, by assistants and inspectors under his direction. Such inspection may extend to any or all parts of the work and to the

preparation or manufacture of materials used, whether within the limits of the work or any other place. The Contractor shall furnish the Engineer all information relating to the work and to the materials which the Engineer may deem necessary or pertinent and

with such samples of materials as may be required. The Contractor shall, at his own expense, supply labor and assistance as may be necessary in handling material for proper inspection.

A. The representatives of the Owner, Engineer and any State, Federal or other agency having jurisdiction over the work, shall have access to the work wherever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection.

B. Owner Inspectors shall be authorized to inspect all work done and all materials furnished, including preparation, fabrication and manufacture of the materials to be used. The Inspector shall not be authorized to alter or waive requirements of the Drawing and Specifications. The Inspector shall call to the attention of the Contractor to failures of the work and/or materials to conform to the Drawings and Specifications. The Inspector may reject materials or suspend work until questions at issue can be referred to, and decided by, the Owner's Project Manager or designated representative. The presence of the Inspector shall in no way lessen the responsibility of the Contractor.

C. The Contractor shall furnish all necessary facilities and assistance to make any examination of the complete work if such examination is deemed advisable by the Engineer. If any of the work is found defective in any respect, the Contractor shall defray the expense of the examination and satisfactory reconstruction. If the work is found acceptable, the expense of the examination shall be added to the Contractor's final estimate.

D. Work covered up without consent or approval of the Owner must, if required by the Inspector, be uncovered for examination and properly restored at the Contractor's expense.

E. If the Specifications, the Engineer's instructions, codes, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection; and, if the inspection is by an authority other than the Engineer, of the date fixed for such inspection.

F. Final Inspection: Upon notice from the Contractor that work is complete, the Engineer and Owner will make a final inspection, and will notify the Contractor in writing of all defective, incomplete or otherwise unacceptable work revealed by the inspection. The Contractor shall immediately correct all such deficiencies to the satisfaction of the Engineer and Owner. The Engineer will then certify the project in writing to SCDHEC, copying the Owner, and request a final regulatory agency inspection.

01-06 VERIFICATION OF DIMENSIONS AND ELEVATIONS: Dimensions and elevations indicated on the drawings in reference to existing structures, location of utilities, sewer

inverts, or other information on existing facilities, are the best available data obtainable but are not guaranteed by the Engineer. The Engineer will not be responsible for their accuracy. Before proceeding with any work dependent upon the data involved, the Contractor shall field check and verify all dimensions, grades, inverts, lines, elevations, or other conditions of limitations at the site of the work to avoid construction errors or damage to existing facilities. If any work is performed by the Contractor, or any subcontractors, prior to adequate verification of applicable data, any resultant extra cost for adjustment of work necessary to conform to existing conditions, or damage to existing facilities, shall be assumed by the Contractor without reimbursement or compensation by the Owner.

If the Contractor, in the course of the work, finds any discrepancy between the drawings and the physical conditions of the locality, or any errors or omissions in drawings or in the layout as given by survey points and instructions, he shall immediately inform the Engineer, in writing. The Engineer will promptly investigate the reported conditions and, after Owner approval, shall issue such instructions as may be necessary for the proper execution of the work. Any work done after such discovery and prior to receipt of such instructions shall be at the risk of the Contractor.

01-07 CARE OF EXISTING FACILITIES: In executing the work, the Contractor shall exert every effort not to damage any existing utilities or the Owner's existing facilities or to break into them. Any damage that is done thereto shall be promptly repaired by the Contractor or by the Owner, at the Owner's option, and at the Contractor's expense. The contractor shall not interrupt or interfere with the operation of existing utilities or facilities during construction except when absolutely necessary. When this is the case, he shall consult with the Engineer, Owner and the utility company as to procedure, and shall be governed by their decision. Any damage done shall be promptly reported to the affected utility for repair. Damage to existing facilities shall be repaired promptly.

A. The Engineer does not guarantee that all existing facilities such as buildings, fences, pipelines, electrical lines, conduit, telephone cable, service connections, or other facilities are shown on the plans. It shall be the Contractor's responsibility to locate and protect all such existing facilities prior to beginning construction.

B. Contractor's Responsibilities. Contractor shall conduct his operations in a manner and sequence which will provide for the continued transportation of wastewater flows during construction of this project. Contractor shall take all actions required to prevent discharge of sewer flow from the system to the ground or any stream. Any construction actions that impede or interrupt flow shall be carefully executed and monitored to prevent surcharging and overflow.

C. Any existing surface or subsurface improvements, such as pavement, curbs, sidewalks, pipe or utilities, footings, or structures (including portions thereof),

trees and shrubbery, not indicated on the drawings or noted in the specifications as being removed or altered shall be protected from damage during construction of the project. Any such improvements damaged during construction of the project shall be restored to a condition equal to that existing at time of award of contract.

D. Any such improvements damaged during construction of the project shall be restored to a condition equal to that existing at time of award of contract. All repairs to utility services shall be coordinated with the applicable utility company, and shall be made in strict accordance with their requirements.

01-08 CONNECTING TO EXISTING WORK: It shall be the express responsibility of the Contractor to connect his work to each part of the existing work or work previously installed as required by the drawings and specifications to provide a complete installation. Connections to existing sewer lines, prior to completion, may be allowed by the Owner on a case by case basis where requested by the Contractor and approved by the Owner; otherwise, connections to existing sewer lines shall be made only after all inspections are completed and all punch list items have been adequately addressed. During construction of new sewer lines, no physical connection to any existing pipeline by open channel or sawed off pipe shall be allowed until all lines upstream and/or downstream of connection have been approved for use by DHEC.

01-09 INSURANCE: The Contractor shall not start work under this contract until he has obtained all the insurance required under this paragraph and such insurance has been approved by the Owner. The Contractor shall not allow any subcontractor to start work on his subcontract until the insurance required of the subcontractor has been so obtained and approved.

A. Compensation and Employer's Liability Insurance: The Contractor shall procure and maintain during the life of the contract the statutory Workmen's Compensation and Employer's Liability Insurance for all of his employees to be engaged in work on the project under the contract. The Contractor shall require all subcontractors to provide Workmen's Compensation and Employer's Liability Insurance of all their employees to be engaged in such work.

B. General Public Liability and Property Damage Insurance: The Contractor shall procure and maintain during the life of the contract General Public Liability and Property Damage Insurance, including vehicle coverage, to protect him from all claims for destruction of or damage to property, arising out of or in connection with any operations under the contract, whether such operations be by himself or by any subcontractor under him, or anyone directly or indirectly employed by the Contractor or by a subcontractor under him. The amount of such insurance shall be not less than the following limits of liability.

1) $500,000 for all damages arising out of bodily injury, including death, at any

time resulting therefrom, sustained by any one person in any one accident; and $500,000 aggregate for any such damages sustained by two or more persons in any one accident.

2) $200,000 for all property damage sustained by any one person in any one accident; and $200,000 aggregate for any such damage sustained by two or more persons in any one accident.

C. Special Hazards Insurance: Where special hazards are encountered in the work under this contract, such hazards shall be covered by a rider to the policy or policies required under subparagraph B in an amount not less than those stipulated under subparagraph B. The Contractor shall be responsible for procuring this insurance before performing any work involving special hazards.

D. Flood Insurance: The Contractor shall procure and maintain during the life of the contract adequate flood insurance to cover all work on this project.

E. Certificates of Insurance: Prior to starting any work, the Contractor shall furnish the Owner with certificates showing the type, amount, class of operations, effective dates and expiration dates of all insurance policies. Each certificate shall contain the following statement: **"The insurance covered by this certificate shall not be cancelled or materially altered, except after ten (10) days written notice has been received by the Owner."**

F. Railroad Insurance:

1) The Contractor shall be able to furnish the Railway Company the following:

a) Certificate of Workmen's Compensation or Employer's liability insurance according to the laws of the State.

b) Certificate of the contractor's Public Liability Insurance, to protect the Contractor and Subcontractor:

1) For loss of life or injury to any one person in an amount not less than $150,000 for any one person and not less than $300,000 for any one accident.

2) For property loss or damage in an amount not less than $150,000 for any one accident and not less than $300,000 aggregate.

c) The original policy of Railroad Protective Liability Insurance naming

the Railway Company as the insured.

1) For loss of life or injury to any one person in the amount not less than $150,000 for any one person and not less than $300,000 for any one accident.

3) For property loss or damage in an amount not less than $150,000 for any one accident and not less than $300,000 aggregate.

SECTION 02

Rights-of-Way and Easements

02-01 SCOPE:

This section covers the requirements and work pertaining to the rights-of-way and easements necessary for the construction of the project.

02-02 WORK ON RIGHTS-OF-WAY AND EASEMENTS:

A. The Owner will obtain all land and rights-of-way necessary for all work under this contract, except for County, Town or City roads or streets. If all land and rights-of-way are not obtained before construction begins, the Contractor shall start work only upon such land and rights-of-way previously obtained by the Owner, and no claims for damages will be allowed because of such delay. If the Owner is unable, for any reason, to obtain the land and rights-of-way necessary for the work, the contract time will be extended as required to cover the time lost by such delay. The Contractor shall secure copies of all applicable right-of-way plats to be kept at the job site during construction.

B. Contractor shall confine his construction operations to the immediate vicinity of the location shown on the plans and in no case shall he encroach beyond the limits of the Owner's property or rights-of-way. The exact location of the rights-of-way limits shall be shown on the rights-of-way plats which will be furnished to the Contractor. He shall place materials, equipment, supplies, etc., so as to cause the least possible damage to property and interference with traffic. His method of operation and placing of equipment shall be subject to the approval of the Engineer. Any damage done to property outside the rights-of-way limits shall be the financial responsibility of the Contractor. Any vehicular access to right-of-way which crosses private property shall be by written permission of the property owner with copy of same provided to Owner Representative.

C. It shall be the duty of the Contractor to locate the limits of the rights-of-way, or property lines, prior to beginning construction. He shall be solely responsible for any damage to trees, crops or other property outside the boundaries of the rights-of-way and shall make satisfactory settlement for any damage directly with the property owner involved.

D. Clearing and Grubbing. Contractor shall consult with the Owner and Engineer prior to beginning clearing and a full understanding is to be reached as to procedure. Contractor shall then conduct clearing and grubbing operations in strict accordance with these agreements.

1) Clearing and grubbing along sewer line shall be done prior to pipe installation. Where a temporary construction easement is obtained, clearing shall be limited to that which is absolutely necessary for construction of the

project. The entire permanent right-of-way shall be cleared and grubbed, unless otherwise noted. All timber cut shall be completely removed and disposed of by the Contractor within ten days, unless otherwise noted on the plans.

2) Grubbing of Stumps shall be done in any convenient manner satisfactory to the Engineer and which will not cause damage to the remaining trees or adjacent property. No burying of construction debris will be allowed in right-of-way limits. If burying is done outside right-of-way limits, written permission from the property owner must be obtained.

3) Minor Structures within rights-of-way limits shall be removed and disposed of as directed by the Engineer. Fences shall be removed as required by construction and replaced to property owners' satisfaction with materials as good as or better than that which was removed. Temporary fencing, as required, shall be installed to property owners' satisfaction until permanent fencing can be erected.

4) Burning of Cleared Material shall be accomplished in strict compliance with all applicable local, state and federal regulations pertaining to open burning and smoke abatement. Contractor shall contact the local office of the Department of Health and Environmental Control for burning permit.

02-03 WORK ON STATE AND COUNTY HIGHWAYS OR ROADS, TOWN OR CITY ROADS OR STREETS, RAILROAD AND OTHER UTILITY RIGHTS-OF-WAY:

A. The Contractor shall not begin excavation, grading, fill, storm drainage, paving and any other construction or installations on any property or in any right-of-way of streets, highways, public carrier lines, utility lines (either aerial, surface or subsurface), etc. until the necessary permits are secured. The Contractor shall conform to all requirements of the authorities having jurisdiction and to the applicable requirements of the specifications. Contractor shall make all necessary arrangements with the proper authorities, including approval of construction methods, etc., and shall pay all costs charged in connection with work. Contractor shall notify the South Carolina Department of Transportation at least 24 hours in advance of any work performed on State roads and shall notify County Roads and Bridges at least 24 hours in advance of any work performed on County roads.

B. The Contractor shall provide full time flagmen, with appropriate red flags, at all times when work is in progress along highways. Suitable warning and descriptive signs shall be placed at each end of the working area while work is in progress along highways. These signs shall be well tended, and shall be placed at sufficient distances from the work so that ample warning is given to approaching

traffic. Signs shall be adequately lighted at night. All traffic control devices and methods shall comply with the latest edition of South Carolina Department of Highways and Public Transportation Traffic Control Manual.

C. Where pipe is installed in open cut across a highway, the cut shall be immediately backfilled and all work of repairing the pavement completed within the same week that it is cut. The Contractor shall keep at least one full lane open for traffic at all times. Any subsequent settlement shall be immediately corrected and repaired. Refer to Section 11 for paving and surfacing specifications.

D. Where a sewer line crossing under a highway is installed within encasement pipe, the encasement pipe shall be provided as specified in Section 9, Boring and Tunneling.

E. Unless otherwise indicated, no excavated material shall be placed on the pavement side of the ditch along highways. The least possible amount of ditch shall be left open when work is not in progress, and equipment shall be removed from the pavement and shoulders during shutdown periods. Shoulders of roadways shall be left in good acceptable condition, and all disturbed topsoil and grass shall be replaced.

F. The Contractor shall not begin work on any property of any Railroad until the Owner has secured necessary permits. Contractor shall conform to all requirements of the Railroad, or its authorized representatives, in the construction of this portion of the work.

1) The Contractor shall also pay the cost of flagmen or other expenses of the railroad in protecting rail or vehicular traffic. He shall notify the railroad of the time that the work will be done and shall not begin work until authorized by Railroad officials.

02-04 RESTORATION OF RIGHT-OF-WAY:

A. During construction, the Contractor shall maintain the site and adjacent public and private property, including streets and highways, free from accumulations of waste debris, rubbish and dirt caused by his operations. Dry materials and rubbish shall be wet down as necessary to prevent blowing dust.

B. Immediately after completion of the work, or any substantial unit or portion of it, the Contractor shall remove all unused material, refuse and dirt placed by him in the vicinity of the work and shall leave the premises in a neat and orderly condition, satisfactory to the Engineer.

C. The right-of-way shall be restored to original or better condition. Horizontal benches shall be provided to facilitate access to the site and shall be located where directed by the Engineer and the Owner. Fill material, where required,shall be free of grass, roots, rock and other objectionable material and shall be spread evenly and properly compacted. The entire right-of-way shall be graded, dressed off and cleaned up to the satisfaction of the Engineer, Owner and property Owner, where applicable.

1) Where work is along streets or highways and dirt has been placed on the pavement, the pavement shall be swept clean of all dirt after backfill has been completed.

2) Site: The Contractor shall clean up behind the work as much as is reasonably possible as the work progresses, but in no case shall the pipe laying operation be more than 1000 feet ahead of complete cleanup. Upon completion of the work and before acceptance of the Final Payment for the project by the Owner, the Contractor shall remove all his surplus and discarded materials, excavated material and rubbish from the roadways, sidewalks, parking areas, lawns and all adjacent property; shall restore, in an acceptable manner, all property, both public and private, which has been disturbed or damaged during the prosecution of the work; and shall leave the whole site in a neat and presentable condition.

3) Except where specifically directed otherwise by the property owner, the entire construction right-of-way shall be provided with a permanent grass cover within 30 days after backfilling. Topsoil shall be replaced and seed planted, fertilized and watered until a grass cover satisfactory to the Engineer and property owner is obtained. If necessary, a temporary grass cover shall be provided until a permanent cover can be established. Grassing shall be as specified in Section 12. If required by the property owner, shrubbery shall be replaced to the satisfaction of the Engineer and the property owner.

SECTION 03

Temporary and Permanent Erosion and Sedimentation Control

13-01 SCOPE:

A. Submittals: Submit a written plan to Engineer for both temporary and permanent grassing. The plan shall include selection of species, dates and rates of application for seeding, fertilizer and mulching.

B. Basic Principles:

1) Conduct the earthwork and excavation activities in such a manner to fit the topography, soil type and condition.

2) Minimize the disturbed area and the duration of exposure to erosion elements.

3) Stabilize disturbed areas immediately.

4) Safety convey run-off from the site to an outlet such that erosion will not be increased off site.

5) Retain sediment on site that was generated on site.

6) Minimize encroachment upon watercourses.

C. Temporary Erosion and Sedimentation Control: In general, temporary erosion and sedimentation control procedures shall be directed toward:

1) Preventing soil erosion at the source.

2) Preventing silt and sediment from entering any waterway if soil erosion cannot be prevented.

3) Preventing silt and sediment from migrating downstream in the event it cannot be prevented from entering the waterway.

D. Permanent Erosion Control: Permanent erosion control measures shall be implemented to prevent sedimentation to the waterways and to prevent erosion to the Project site.

13-02 QUALITY ASSURANCE:

A. General: Perform all work under this Section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated above and these Specifications.

B. Conflicts: Where provisions of pertinent rules and regulations conflict with these Specifications, the more stringent provisions shall govern.

13-03 MATERIALS:

A. Temporary Erosion and Sedimentation Control Materials:

1) Silt Fence:

a) Silt fence shall be polymer type netting with a built-in cord running throughout the top edge of the fabric. Posts shall be either steel or pressure treated fir, southern pine or hemlock and shall be spaced not more than six feet on center. Silt fence shall be provided with netting to provide reinforcing when necessary. Silt fence fabric shall have an Equivalent Opening Size (EOS) of 40 to 100. Silt fence fabric shall have a maximum permeability of 40 gallons per minute per square foot.

b) Silt fence fabric shall be equal to Mirafi 100X, A or Approved Equal.

2) Wire fabric shall be 6”6” 10 gage.

3) Netting shall be ½-inch, galvanized steel, chicken wire mesh.

4) Filter stone shall be coarse aggregate conforming to South Carolina Department of Highways and Public Transportation, Aggregate Number CR-14.

5) Concrete block shall be hollow, non-load-bearing type.

6) Hay bales shall not be used.

B. Rip-Rap:

1) Use only one method throughout the job.

2) Stone Rip Rap: Use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Unless shown or specified otherwise, stone rip rap shall be Type 1 rip rap.

a) Type 1 Rip Rap: Stone pieces shall range in weight from a minimum of 25 pounds to a maximum of 250 pounds. At least 60 percent of the stone pieces shall weigh more than 150 pounds. Rap rap shall conform to South Carolina Department of Highways and Public Transportation Standard Specifications 804.04.

b) Type 2 Rip Rap: Stone shall vary in size with no pieces weighing more than 150 pounds. At least 20 percent of the stone pieces, excluding spalls, shall weigh more than 60 pounds, and no more than 20 percent of the stone pieces, excluding spalls, shall weigh less than 25 pounds. Rip rap size shall conform to South Carolina Department of Highways and Public Transportation Standard Specifications 804.03.

c) 200 Pound Rip Rap: Minimum weight of individual stones shall be 200 pounds.

3) Sand-Cement Bag Rip Rap:

a) The bags shall be of cotton, burlap or fiber reinforced paper capable of containing the sand-cement mixture without leakage during handling and placing. Bags previously used for sugar or any other material which will adversely affect the sand-cement mixture shall not be used. Capacity shall be not less than 0.75 cubic foot, nor more than two cubic feet.

b) Sand and Portland cement shall be mixed at the maximum ratio of 5:1 by weight and shall obtain a minimum compressive strength of 500 psi in seven days. For sand-cement bag rip rap, the amount of water used shall be just enough to make up the optimum moisture content of the aggregate and cement, as determined by ASSHTO T 134. When sand-cement rip rap is to be pre-bagged, the sand-cement shall be mixed dry, and after placing each course, the bags shall be wet until sufficient moisture is present for proper cement hydration.

C. Filter Fabric:

1) The filter fabric for use under rip rap shall be a monofilament, polypropylene woven fabric meeting the specifications as established by Task Force 25 for the Federal Highway Administration. The filter fabric shall have an equivalent opening size (EOS) of 70.

2) Filter fabric under rip rap shall be equal to Mirafi, Amoco or Exxon.

D. Concrete:

1) Concrete shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

2) Provide a concrete mix design for job mixed concrete for the Engineer's approval.

E. Gabions:

1) Gabions shall be large, multi-celled, rectangular wire mesh boxes filled with rip rap to prevent erosion, scour or sloughing of an embankment. Gabions shall have the following features.

a) Hexagonal mesh pattern, which under stress will deform but not break.

b) Triple twist, which will make the mesh non-raveling.

c) Reinforcing wires woven into each corner, which will increase the strength at the stress points and help the gabion retain its shape, during and after filling.

d) A diaphragm securely attached to the base, which will prevent the shifting of the stone, and at the same time, reinforce the gabion.

2) The wire mesh shall have an opening of approximately 3 x 4-inches and shall be a minimum 12 gauge. Wire mesh shall be galvanized.

3) Gabion baskets shall be 12 feet long x 3 feet high with four cells.

4) Gabions shall be equal to Maccaferri Gabions, Inc.

13-04 INSTALLATION:

A. General:

1) Standards: Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Best Management Practices of the Erosion and Sediment Control Practices for Developing Areas, and local enforcing agency guidelines and these Specifications.

2) Implementation: The work shown on the approved plans and working drawings shall be considered a minimum requirement. What is shown shall not relieve the Contractor of the responsibility to actively take all steps necessary to control soil erosion and sedimentation.

B. Temporary Erosion and Sedimentation Control:

1) Temporary erosion and sedimentation control procedures should be initially directed toward preventing silt and sediment from entering the creeks. The preferred method is to provide an undisturbed natural buffer, extending a minimal 5 feet from the top of the bank, to filter the run-off.

Should this buffer prove infeasible due to construction activities being too close to the creek, or if the amount of sediment overwhelms the buffer, the Contractor shall place silt fences to filter the run-off and, if necessary, place permanent rip rap to stabilize the creek banks. When excavation activities disturb the previously stated preventative measures, or if they are not maintained, or whenever the construction activities cross the creeks, check dams shall be installed downstream and within 200 feet of the affected area.

2) Silt dams, silt fences, traps, barriers, check dams, appurtenances and other temporary measures and devices shall be installed as indicated on the approved plans and working drawings, shall be maintained until no longer needed, and shall then be removed. Deteriorated hay bales and dislodged filter stone shall be replaced with new materials. Detention ponds, if constructed, shall be maintained in a condition ensuring that unfiltered water will not leave the pond.

3) Where temporary grassing is not appropriate, and where the Contractor's temporary erosion and sedimentation control practices are inadequate, the Engineer may direct the Contractor to provide temporary vegetative cover with fast growing seedings. Such temporary vegetative cover provided by the Contractor in compliance with the Best Management Practices of the Erosion and Sediment Control Practices for Developing Areas, specifically in the selection of species, planting dates and application rates for seedings, fertilizer and mulching, with the exception that kudzu shall not be permitted.

4) All erosion and sedimentation control devices, including check dams, shall be inspected by the Contractor at least weekly and after each rainfall occurrence and cleaned out and repaired by the Contractor as necessary.

5) Temporary erosion and sedimentation control devices shall be installed and maintained from the initial land disturbance activity until the satisfactory completion and establishment of permanent erosion control measures. At that time, temporary devices shall be removed.

C. Permanent Erosion Control: Permanent erosion control shall include:

1) Restoring the work site to its original contours, unless shown otherwise on the Drawings or directed by the Engineer.

2) Permanent vegetative cover shall be performed in accordance with "Grassing" of this Section and Section 12.

3) Permanent stabilization of steep slopes and creeks shall be performed in accordance with "Rip Rap" of this Section.

4) Permanent erosion control measures shall be implemented as soon as practical after the completion of pipe installation or land disturbance for each segment of the Project. In no event shall implementation be postponed when no further activities related to pipe installation will impact that portion or segment of the Project. Partial payment requests may be withheld for those portions of the Project not complying with this requirement.

D. Grassing:

1) General:

a) All references to grassing, unless noted otherwise, shall relate to establishing permanent vegetative cover as specified herein for seeding, fertilizing, mulching, etc.

b) When final grade has been established, all bare soil, unless otherwise required by the Contract Documents, shall be seeded, fertilized and mulched in an effort to restore to a protected condition. Critical areas shall be sodded as approved or directed by the Engineer.

c) Specified permanent grassing shall be performed at the first appropriate season following establishment of final grading in each section of the site.

d) Permanent grassing shall be of perennial species.

2) Replant grass removed or damaged in residential areas using the same variety of grass and at the first appropriate season. Where sod is removed or damaged, replant such areas using sod of the same species of grass at the first appropriate season. Outside of residential or landscaped areas, grass the entire area disturbed by the work on completion of work in any area. In all areas, promptly establish successful stands of grass.

3) Grassing activities shall comply with the Best Management Practices of the Erosion and Sediment Control Practices for Developing Areas, specifically for the selection of species, with the exception that kudzu shall not be permitted, planting dates and application rates for seeding, fertilizer and mulching. Where permanent vegetative cover (grassing) cannot be immediately established (due to season or other circumstances) the Contractor shall provide temporary vegetative cover.

E. Rip-Rap:

1) Unless shown otherwise on the Drawings, rip rap shall be placed where ordered by the Engineer, at all points where banks of streams or drainage ditches are disturbed by excavation, or at all points where their natural vegetation is removed. Carefully compact backfill and place rip rap to

prevent subsequent settlement and erosion. This requirement applies equally to construction along side of stream or drainage ditch as well as crossing a stream or drainage ditch.

2) When trenching across a creek, place rip rap a distance of 10 feet upstream and 10 feet downstream from the top of the trench excavation. Place rip rap across creek banks and extend rip rap placement five feet beyond the top of each creek bank.

3) Preparation of Foundations: The ground surface upon which the rip rap is to be placed shall be brought in reasonably close conformity to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers. Unless at creek banks or otherwise shown or specified, rip rap shall begin in a toe ditch constructed in original ground around the toe of the fill or the cut slope. The toe ditch shall be two feet deep in original ground, and the side next to the fill or cut shall have that same slope. After the rip rap is placed, the toe ditch shall be backfilled and the excess dirt spread neatly within the construction easement.

4) Placement of Filter Fabric: The surface to receive fabric shall be prepared to a relatively smooth condition free from obstructions, depressions and debris. The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3-inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be placed loosely so as to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than three feet during construction. The fabric shall be protected at all times during construction. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals or other contaminants. Any contaminated fabric or any fabric damaged during its installation or during placement of rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no expense to the Owner.

5) Placement of Rip Rap: The rip rap shall be placed on a 6-inch layer of soil, crushed stone or sand overlaying the filter fabric. This 6-inch layer shall be placed to maximize the contract between the soil beneath the filter fabric and the filter fabric. Rip rap shall be placed with its top elevation conforming with the natural slope of the stream bank and stream bottom.

a) Stone Rip Rap: Stone rip rap shall be dumped into place to form a uniform surface and to the thickness specified on the Drawings. The thickness tolerance for the course shall be 6-inches and +12-inches. If the Drawings or Bid do not specify a thickness, the course shall be placed to a thickness of not less than 18-inches.

b) Sand-Cement Bag Rip Rap: The bags shall be uniformly filled to the maximum capacity which will permit satisfactory tying. The bagged rip rap shall be placed by hand with the tied ends facing the same direction, with close, broken joints. When directed by the Engineer or required by the Drawings, header courses shall be placed. After placing, the bags shall be rammed or packed against one another to produce the required thickness and form a consolidated mass. The top of each bag shall not vary more than 3-inches above or below the required plane.

6) Gabions:

a) Where, in the opinion of the Engineer, the slope of the banks of the stream is too steep to support rip rap, gabions shall be provided in lieu of rip rap.

b) Gabions shall be assembled according to the manufacturer's recommendations. Laterally adjoining gabions shall be wired together by vertical edges. Vertically adjoining gabions shall be wired together along the front and back edges. Rip rap size for gabion construction shall be large enough not to fall out of gabions, but small enough to form three layers. Gabions shall be placed over a 6-inch layer of soil, crushed stone or sand overlaying a filter fabric. This 6-inch layer shall be placed to maximize the contact between the soil beneath the filter fabric and filter fabric.

SECTION 4

Trench Excavation and Backfilling

04-01 SCOPE:

Work consists of all necessary trench excavation and backfill work as shown on the plans and as specified herein.

04-02 GENERAL:

Trench excavation shall be confined to the construction area as shown on the plans, and shall be done in an approved manner with proper equipment. Excavation and backfilling shall be suspended during rain and inclement weather, or when unsatisfactory field conditions are encountered, unless otherwise directed by the Engineer. At all times during construction, Contractor shall maintain proper drainage in the construction area, and shall take all measures necessary for erosion and sediment control.

A. Existing Utilities: The Contractor shall be solely responsible for locating and verifying the location of all existing utilities. The Contractor shall take every precaution to protect existing utilities from damage during construction operations. If damage occurs, the utility involved shall be promptly contacted and repairs made at their direction and at the Contractor's expense. The work shall meet the approval of the utility involved. If the respective utility desires to make repairs with its own forces, the Contractor shall bear all the expenses of the work.

B. When interruptions of existing utilities occur, temporary service shall be provided as directed and approved by the respective utility involved.

C. Notification of intent to excavate:

1) South Carolina Underground Utility Damage Prevention Act (S.C. Code Ann., 58-35-10, CT-SEQ, Supp. 1978) requires persons to ascertain the location of underground public utility property prior to excavation or demolition in certain situations. The Act also requires such persons to give timely notice of intent to excavate or demolish prior to commencing such operations. Failure to comply could subject the violator to a civil penalty for each violation of the Act.

2) Notification of intent to excavate may be given by calling the required Regulatory Agency.

D. If existing utilities are found to conflict with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.

E. Do not proceed with permanent relocation of utilities until verbal instructions are received from the Engineer.

04-03 TRENCH EXCAVATION

A. Trenches for pipe shall be excavated along the lines designated by the Engineer and to the depths necessary for laying sewers to the required grades. The cover over PVC pipe shall not be less than 3 feet. Where the cover is less than 3 feet, that section shall be ductile iron pipe.

1) Do not excavate trench more than 200 feet ahead of pipe laying, unless permitted by the Engineer.

2) Where trenching occurs in existing lawns, and seeding is not an option, remove turf in sections with appropriate turf cutting equipment and keep damp. Replace turf upon completion of the backfilling.

3) Where trenching takes place in existing concrete or asphalt pavement, the pavement shall be saw cut a width 2 feet wider than the top width of the trench, unless otherwise noted on the drawings. Ragged edges of pavement shall be recut as required prior to paving to form a straight and uniform alignment.

4) Sides of trenches shall be kept as nearly vertical as possible. Maximum trench width up to a level 24 inches above the top of the pipe shall be as shown on the plans.

5) Water which is found in or accumulates in trenches shall be pumped, bailed or otherwise removed. All machinery required for pumping or bailing shall be furnished by the Contractor. Trenches shall be kept free of water while pipe is being laid. Disposal of water after removal shall be satisfactory to the Engineer. There will be no disposal into existing sewer.

04-04 CLASSIFICATION OF EXCAVATION:

All excavation shall be unclassified, except as otherwise specified below.

A. Classified Excavation: This item covers the excavation of solid rock for sewer lines and structures, disposal of excavated rock, and backfilling of the excavation to the level of the original ground line. Work shall include all labor, materials, equipment and permits required for excavation of rock.

1) Classified excavation shall be material which cannot be removed by means other than blasting or with air hammer. Material which can be removed by ripping shall not be considered "classified excavation."

2) Where rock is encountered the trench shall be excavated to a depth as shown and the pipe bedded in angular material as specified in Section 8-05 Rock excavation in pipe trenches shall be removed 8 inches beyond each side of the pipe outside diameter and 6 inches below the outside bottom of the pipe.

3) Contractor shall give the Engineer ample notice so that he or the Owner Representative can measure the rock as it is excavated and before any backfilling has taken place. Contractor shall provide drilling and blasting information.

B. Blasting: All blasting, where required, shall be done under the personal supervision of a licensed individual thoroughly skilled in this class of work. All necessary measures to protect life and property shall be taken. Where in close proximity to buildings, transmission lines, telephone lines or other facilities, timber mats or other means of preventing damage from flying debris shall be used. Ample and suitable signals shall be given in proximity to the work before each blast, and flagmen shall be placed on all roads beyond the danger zone in every direction to warn traffic. Contractor shall be responsible for all damage resulting from blasting. The Blasting Permit Number shall be given to the Owner/Engineer prior to blasting.

04-05 BEDDING OF PIPE:

A. Pipe bedding material for PVC pipe shall be angular material in a general size range of 1/4-inch to 3/4-inch, at a minimum depth of 4 inches below bottom of pipe and to the depth of 6 inches where classified excavation is necessary.

1) Select material for backfill shall be suitable material from the excavation free of large stones, hard lumps, debris and other objectionable material. If select material is not available from the excavation, it shall be hauled to the site at Contractor's expense.

2) Angular material shall be crushed stone or gravel conforming to ASTM D448, either Size No. 67 or Size No. 57.

3) All trenches shall be excavated below the established subgrade as required to provide for preparation of trench bottoms in strict accordance with the improved ditch bedding details as shown. Stone bedding shall be so shaped that the load is supported throughout the entire length of the pipe barrel, and not at the pipe bells. Bell holes shall be dug to relieve bells of the load and to provide for completion of joints.

4) Pipe bedding for ductile iron pipe shall be Class "D" or Class "C" as required by conditions or designated on plans.

5) Class "B" bedding shall be required where:

(a) PVC pipe is used. Bedding shall extend a minimum of 4 inches below pipe and up to the springline of pipe. Where rock is encountered, bedding shall extend a minimum of 6 inches below pipe. Angular material shall be as specified in Section 8-05 A.2).

(b) Pipe depth exceeds 18 feet.

(c) Specifically noted on the plans or where directed by Engineer or Inspector.

04-06 BACKFILLING OF TRENCHES:

Backfilling of trenches shall progress as rapidly as pipe-laying will permit.

A. Backfill around the pipe and above the top of the pipe to a height of at least 12 inches above the top of the pipe shall be placed in layers not more than 6 inches thick. Only select material or angular material (where required) shall be used for this portion of backfill. As fast as the material is placed, it shall be cut under the haunches of the pipe with a shovel and thoroughly compacted with light tamps for the full width of the trench to provide support for the bottom and sides of the pipe. Backfilling shall be carried up evenly on both sides in 6-inch lifts to 12 inches above the pipe.

B. Trench backfilling shall be deposited in level lifts, free of objectionable material and boulders and thoroughly compacted. No rock shall be placed in backfill that cannot be easily removed by hand. Compaction shall be such as to prevent future settlement and shall be done by acceptable means, approved by the Engineer.

1) Compaction will be accomplished by the use of a mechanical hand tamp or "sheepsfoot" trench roller. Where a mechanical hand tamp is used, lifts shall be placed in a maximum of 12-inch layers for 95% compaction and a maximum of 18-inch layers for 90% compaction. Where a sheepsfoot roller is used, lifts shall be placed in a maximum of 18-inch layers for 95% compaction and 24-inch layers for 90% compaction. Either method will require four passes up and down the trench line on either side of the pipe (one pass will be defined as one run up the trench and back down again).

2) A hydro tamp may be used for compaction for the final two feet of backfill provided there is a minimum of seven feet of cover over the pipe.

3) Rolling with rubber tired vehicles or track type equipment will not be allowed.

4) Compaction shall be at least 90% of maximum as established by ASTM D698 (Standard Proctor); except that under pavement, compaction shall be at least 95% of maximum per ASTM D698.

C. Under pavement, the top of the trench shall be filled with an aggregate base as specified in Section 11-02 C. Tamp each layer to a density equivalent of not less than 95% of ASTM D698 Proctor Curve (Standard Proctor).

D. Contractor shall be responsible for final subsidence of all trenches, and shall leave trenches flush with the original ground after all settlement has taken place. Any settlement of backfill below finish grade shall be promptly corrected. Trenches shall be protected against scour due to surface drainage.

E. Backfill around manholes shall, in general, conform to the requirements for backfilling trenches, except that no backfill shall be placed around manholes until all mortar has properly set.

04-07 COMPACTION TEST:

All backfill will be subject to a compaction test by an independent laboratory selected by the Engineer or Owner. If compaction fails the test, Contractor shall remove and replace backfill to the satisfaction of the Engineer and the Owner, and shall also pay for the cost of the test.

SECTION 05

Grassing

05-01 SCOPE:

This section covers cultivating, fertilizing and planting grass on all pipeline rights-of-way, as shown on the plans or as directed by the Engineer.

05-02 GENERAL:

It is the intent of these specifications to provide a complete grassing procedure which shall be carefully followed, and, upon consultation with the Engineer, shall be adjusted to meet unforeseen weather and soil conditions so as to secure a successful planting of the areas to be grassed. Approval from the Owner shall be obtained before these areas will be acceptable. All eroded areas shall be filled and completely covered with grass before being acceptable.

05-03 FERTILIZING AND GRASSING:

A. Material shall be approved by the Engineer prior to use.

1) Seed shall be Fescue, Bermuda or Pensacola Bahia, or a combination thereof, as required by seasonal or soil conditions, with at least 90% purity and 80% germination, conforming to State law.

2) Sod may be used at contractor's discretion. Sod may be Fescue, Bermuda, or Pensicola Bahia or as specified by the Engineer.

B. Planting: All preparation and planting shall be done in an acceptable manner and by competent personnel.

1) Area to be seeded or sodded shall be loosened or pulverized to a depth of 3 to 4 inches by disc harrowing, with all clods broken up, and all sticks and other debris removed.

2) Seed shall be distributed on the prepared area by the use of a commercial applicator that will provide even distribution. Minimum application rates shall be as specified in State law; heavier applications shall be where necessary to provide an acceptable cover.

3) Seed shall then be raked into the ground and lightly covered. After the seed is covered, the area shall be compacted and dressed smooth by a culti-packer or other means acceptable material. Mulch material shall be held in place by covering with light poultry netting staked in place or by a coat of suitable asphaltic material.

4) After planting is completed, the planted areas shall be sufficiently watered. Watering shall be continued as necessary until an acceptable grass cover is obtained.

C. Temporary Cover: If grading is completed and ready for seeding at a time inappropriate for establishing the permanent grass cover, temporary coverage shall be provided for protection of graded surfaces until such time that permanent cover can be established. Temporary cover shall be provided as specified below. Contractor shall return to the site and provide the permanent cover, in the manner specified above, at such time as may be suitable.

1) Surface area to be seeded shall be prepared as for permanent cover.

2) Area to be grassed shall be planted with Rye or Sudan grass for temporary protection. Seed shall be applied in the manner specified above, at such rates as to provide for adequate and acceptable temporary cover.

3) After temporary planting is completed, the planted areas shall be watered as specified above.

D. Maintenance: During the period of the guarantee, the Contractor shall repair all damage due to erosion or other causes, and shall maintain all slopes and grassed areas in good condition until an acceptable grass cover is obtained.

SECTION 06
Warranty

06-01 GENERAL WARRANTY FOR ONE YEAR AFTER COMPLETION:

For a period of at least one year after the Owner's final inspection, the Contractor warrants the fitness and soundness of all work done and materials and equipment put in place under the contract and neither the final certificate of payment nor any provision in the contract documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the contract documents or relieve the Contractor of liability in respect to any express warranties of responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of final acceptance of the work unless a longer period is specified.

A second Owner inspection will be conducted 10 months after the date of acceptance of the project. The Owner will be notified of observed defects after the "10-month" inspection is conducted. The contractor will correct any defects prior to the expiration of the one-year warranty.

A. If in fulfilling the requirements of the contract or of any guarantee embraced therein or required thereby, the Contractor disturbs any work guaranteed under another contract, he shall restore such disturbed work to a condition satisfactory to the Engineer, and shall guarantee such restored work to the same extent as it was guaranteed under such other contract.

B. If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the Owner may have the defects corrected and the Contractor and his Surety shall be liable for all expenses incurred.

C. All special guarantees applicable to definite parts of the work that may be stipulated in the specifications or other papers forming a part of the Contract shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

06-02 MAINTENANCE:

In addition to the guarantee stipulated in the Contract, each Contractor shall fully maintain all work performed under his contract for sixty (60) days after final completion and acceptance of the work. The retained percentage of contract payments shall not be due until after the 60 days maintenance period, except that the Owner may at his discretion release such retainer earlier.