

SECTION 31 11 00  
SITE PREPARATION

PART 1 - GENERAL

1.1 DEFINITIONS

The terms "Clearing" and "Grubbing" used in these specifications will be as defined in the Georgia Department of Transportation Specifications, Latest Edition, Section 201.1.01.

1.2 WORK INCLUDED

Furnish all labor, equipment and materials as required to prepare the construction site for the required work as shown on the drawings or as specified herein. Site preparation required for this project includes, but is not necessarily limited to:

1.2.1 Observation of the following clearing limits. Clearing at construction sites shall be limited to the disturbed area as shown on the Drawings.

1.3 QUALITY ASSURANCE

The Contractor, in conducting the work required on this project, is to cause no damage to property, soils or vegetation outside the limits of construction defined in this and other sections of these Specifications, as shown on the Drawings, or required by the Engineer. Any damage to property soil or vegetation outside the limits of construction shall be repaired immediately, by the Contractor, as defined herein at no additional cost to the Owner.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.1 WORKMANSHIP

3.1.1 Clear all trees, shrubs, and ground vegetation from the site as necessary to install the proposed water main. These cleared materials shall be chipped and spread uniformly over cleared area after construction or burned in accordance with Georgia D.O.T. Specifications and local laws. Pits for burning must be approved by the Engineer.

3.1.2 Those areas which are cleared beyond specified limits shall be restored to their original state at the expense of the Contractor. Trees damaged during construction

shall be replaced by the Contractor; at the Engineer's discretion, trees that are damaged during construction may have their wounds dressed and coated with an approved pruning paint.

### 3.2 ENVIRONMENTAL PROTECTION

3.2.1 Defined in Section 31 25 00.

3.2.2 During construction the Contractor shall provide preventive measures as may be required by governing laws or ordinances to prevent siltation and soil erosion.

**\*\*END OF SECTION\*\***

SECTION 31 23 19  
CONSTRUCTION DEWATERING

PART 1 - GENERAL

- 1.1 The Contractor shall be responsible for controlling groundwater in a manner that will preserve the strength of the bedding soils, will not cause instability of the excavation slopes, will not result in damage to existing structures and will not allow ground water or siltation to enter the water main while under construction.
- 1.2 Where permeable soils are encountered at subgrade elevations the Contractor shall maintain the groundwater level a minimum of 3' below the bottom of the trench.
- 1.3 Open pumping from sumps and ditches, if it results in boils, loss of fines, softening of the ground, or instability of slopes will not be permitted.
- 1.4 The Contractor shall submit for the Engineer's approval a construction dewatering plan. The plan shall indicate the method of dewatering to be used, the location of any wells or pumps, and where pumped groundwater is to be discharged. No excavation will be allowed without an approved dewatering plan.

PART 2 - PRODUCT

- 2.1 Equipment used for dewatering is optional to the Contractor.
- 2.2 Mechanical equipment used shall be in good working order and suitable for use under the anticipated conditions.
- 2.3 Wells and well points if used shall be installed with suitable screens and filters so that continuous pumping of fines does not occur.

PART 3 - EXECUTION

- 3.1 The Contractor shall maintain and operate his dewatering equipment until the water main installed in areas where ground water is present.
- 3.2 No compensation for removal of unstable material below the subgrade shall be allowed if in the opinion of the Engineer, modified dewatering techniques would solve the problem and result in a suitable subgrade.
- 3.3 Dewatering discharge shall be accessible for collection of samples by the Engineer.
- 3.4 Water shall be disposed of in accordance with applicable Environmental Protection

Agency, US Army Corps of Engineers, Georgia Environmental Protection Division standards and permits, and County and City ordinances.

**\*\*END OF SECTION\*\***

SECTION 31 25 00  
SLOPE PROTECTION AND EROSION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

- 1.1.1 Work under this section shall include furnishing, installing, maintaining, and upon satisfactory completion, removing a water permeable filter fabric silt fence complete with posts and miscellaneous hardware. Work shall also include erosion matting. The quantity of silt fence or erosion matting may be increased or decreased from what is shown on the plans, upon direction of the Engineer or local government authority. Such variations in quantity will not be considered alteration of the scope of the work.
- 1.1.2 Obtain proper permits from local government before land disturbing activities begin. Silt fence or other erosion control devices shall be installed prior to any land disturbing activities.
- 1.1.3 Temporary erosion control measures shall control erosion and sedimentation to an extent such that the turbidity of streams immediately downstream of the project shall not have an increase in turbidity of more than 50 Nephelometric turbidity units (NTU).

1.2 SUBMITTALS

Shop drawings and product data shall be submitted as described in Section 01 33 00.

1.3 PRODUCT HANDLING

- 1.3.1 Protection: Use all means necessary to protect the materials of this Section before, during and after installation.
- 1.3.2 Storage: The fabric shall be wrapped in a heavy duty protective coating. The coating shall be capable of protecting the fabric from mud, dust, dirt, debris and sunlight. The fabric shall not be exposed to temperatures exceeding 140 degrees F.
- 1.3.3 Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer, and at no additional cost to the owner.

PART 2 - PRODUCT

2.1 FILTER FABRIC

2.1.1 Filter fabrics shall be composed of strong rot-proof synthetic fibers formed into either woven or nonwoven fabric. The fabric shall contain stabilizers and or inhibitors for protection against damage due to exposure to direct sunlight. The fabric shall be of stable construction. Fibers shall maintain their relative position, in the fabric, under normal handling, installation, and service. Edges of the fabric shall be finished to prevent the outer yarn from pulling away from the fabric. Fabrics shall be free of defects and or flaws which would affect their physical or filtering properties. Fabrics may be manufactured with pockets for posts, hems with cord, or with posts pre-attached using staples or button head nails. The manufacturer shall have either an approved color mark yarn in the fabric, or label the fabric with the company's name at minimum 100 foot intervals.

2.1.2 Type A Filter Fabric

Type A filter fabric shall be 36" wide. Woven fabric construction shall allow slit tape yarns in one direction (warp or fill) only. The fabric shall meet the following physical and dimensional requirements.

Tensile Strength (ASTM D-4632) Warp.....120 lbs  
Tensile Strength (ASTM D-4632) Fill.....100 lbs  
Elongation (ASTM D-4632).....40% Max  
Apparent Opening Size (ASTM D-4751).....#30  
Flow Rate Min.....25 Gal/Min/Ft<sup>2</sup>

Fabric ultraviolet stability shall conform to ASTM D-4632 after 300 hours weathering in accordance with ASTM D-4355. The fabric bursting strength shall be no less than 175 PSI when tested in accordance with ASTM D-3786 diaphragm bursting strength tester.

2.1.3 Type B Filter Fabric

Type B filter fabric shall be 22" wide. Type "B" shall meet the same physical requirements as type A listed above, with the exception of width.

2.1.4 Type C Filter Fabric

Type C filter fabric shall be 36" wide of a non-calendered woven fabric constructed of monofilament yarns or fibrillated yarn textiles only. The fabric shall meet the following physical and dimensional requirements.

Tensile Strength (ASTM D-4632) Warp.....260 lbs  
Tensile Strength (ASTM D-4632) Fill.....180 lbs  
Elongation (ASTM D-4632).....40% Max  
Apparent Opening Size (ASTM D-4751).....#30  
Flow Rate Min.....70 Gal/Min/Ft<sup>2</sup>

Fabric ultraviolet stability shall conform to ASTM D-4632 after 300 hours

weathering in accordance with ASTM D-4355. The fabric bursting strength shall be no less than 175 PSI when tested in accordance with ASTM D-3786 diaphragm bursting strength tester.

#### 2.1.5 Approved Manufacturers

Manufacturers' products must either be on the Georgia Department of Transportation "Qualified Products List 36" (latest version) or have the Engineer's prior approval.

### 2.2 POSTS AND WOVEN WIRE SUPPORTS

#### 2.2.1 Type "A" Fence

Posts shall be a minimum of 4 feet long and constructed of either wood or steel. Soft wood posts shall be at least 3" in diameter or a nominal 2" X 4" straight enough to provide a fence without noticeable misalignment. Hard wood posts shall be 1-1/2" X 1-1/2" or have a cross sectional area of no less than 2.25 inches square. Steel posts shall be "U", "T", or "C" shapes with a minimum weight off 1.3 pounds per foot, and have projections for fastening the fence to the posts. The maximum post spacing for Type "A" fencing shall be 6 feet.

#### 2.2.2 Type "B" Fence

Posts shall be a minimum of 3 feet long and constructed of either wood or steel. Soft wood posts shall be at least 2" in diameter or a nominal 2" X 2" straight enough to provide a fence without noticeable misalignment. Hard wood posts shall be 1" X 1" or have a cross sectional area of no less than 1 inch square. Steel posts shall be "U", "T", or "C" shapes with a minimum weight off .75 pounds per foot. The maximum post spacing for Type "B" fencing shall be 6 feet.

#### 2.2.3 Type "C" Fence

Posts shall be a minimum of 4 feet long and constructed of steel. Posts shall be "U", "T", or "C" shapes with a minimum weight off 1.3 pounds per foot, and have projections for fastening the fence to the posts. The maximum post spacing for Type "C" fencing shall be 4 feet. Woven wire fence shall be used with Type "C" fence. The wire fence fabric shall be at least 32" high and have at least 6 horizontal wires. Vertical wires shall have a maximum spacing of 12 inches. The top and bottom wires shall be at least 10 gauge and all other wires shall be at least 12.5 gauge. The filter fabric shall be attached to the top of the woven wire fence at the midpoint between posts.

### 2.3 FASTENERS FOR WOODEN POSTS

#### 2.3.1 Wire Staples

Wire staples shall be 17 gauge minimum, have a crown of at least 3/4" inch wide and legs at least 1/2" long. Staples shall be evenly spaced at least 5 per post for Type "A" fence, 4 per post for Type "B" fence.

### 2.3.2 Nails

Nails shall be 14 gauge minimum, 1" long with 3/4" button heads. Nails shall be evenly spaced with at least 5 per post for Type "A" fence, 4 per post for type "B" fence.

## 2.4 EROSION MATTING

### 2.4.1 Mat Specification

The mat shall be constructed of coconut coir mattress fiber, wheat straw, wood, and jute materials. The mat shall be biodegradable over a 4 to 6 year time period. The netting shall be an open weave design that allows the seeding both before and after the mat has been installed.

### 2.4.2 Mat Requirements

Openings	0.3" x 0.45"
Weight	980 g/m <sup>2</sup>
Slope	>1:1
Flow	16 fps
Shear Stress	5 lbs/ sq ft

### 2.4.2 Basis of Design

Control Mat 90 by Granite Environmental.

## 2.5 TURF REINFORCEMENT MAT

2.5.1 Turf Reinforcement Mats for slopes and waterways shall comply with the requirements stated on the Contract Drawings.

2.5.2 Turf reinforcement mat for slopes and water ways shall withstand a maximum velocity of 10 ft/s in an unvegetative state, and 20 ft/s in a vegetative state. The mat shall be designed to be installed on a 1:1 or greater slope.

### 2.5.3 Basis of Design

The turf reinforcement mats shall be PYRAMAT High Performance Turf Reinforcement Mat's produced by Propex Operating Company, Chattanooga, Tennessee, P550 Turf Reinforcement Mat produced by Tensar International Corporation, Poseyville, Indiana, or approved equivalent material and manufacturer.

## PART 3 - EXECUTION

### 3.1 GENERAL



The contractor shall install temporary silt fence as shown on the plans specified herein, or as directed by the Engineer.

### 3.2 INSTALLATION

- 3.2.1 Excavate a trench to a depth of 6" by mechanical means. Excavate by hand if mechanical excavation is not possible.
- 3.2.2 Begin post installation at the center of the low point of the fencing run. Space post according to fence type to a depth of at least 18". Where ground conditions will not allow a depth of 18", secure posts well enough to prevent overturning by sediment loading.
- 3.2.3 Attach filter fabric to posts by wire, cord, pockets, staples, nails, or other acceptable means. The fabric shall overlap at least 18" at all splice joints. The filter fabric shall be attached so that 6" - 8" minimum fabric is left at the bottom to be buried.
- 3.2.4 Install the fabric in the trench with 2-4 inches across the trench bottom in the upstream direction; install the remaining 4-6 inches against the side of the trench. Backfill and compact so that no flow can pass under the barrier.

### 3.3 INSPECTION OF SILT FENCING

Upon completion of installation the Engineer or local government authority shall inspect the silt fencing for proper installation, flaws, defects, rips, holes, or other damage that may have occurred. The contractor shall repair or replace the damaged portions as directed by the engineer or local government authority.

### 3.4 MAINTENANCE OF SILT FENCING

The contractor shall maintain the silt fence until the project is accepted or the fence is removed. Maintenance of the fence shall include; removal and disposal of silt accumulations at the silt fence, replacement of damaged or deteriorated filter fabric, repair or replacement of fence posts, and the installation of additional fencing should the fencing installed prove to be inadequate. Silt shall be cleaned out once it has accumulated to 1/2 the height of the silt fencing.

### 3.5 REMOVAL OF SILT FENCING

Silt fencing shall remain in place unless the Engineer or local government authority directs its removal. Silt fencing that has been removed shall be the property of the contractor and may be reused at another location if in good condition. Damaged or otherwise unwanted silt fencing shall be removed from the site and disposed of properly. After silt fence removal the contractor shall dress out the area and grass according to the specifications Section 32 92 00.

3.5 EROSION MAT INSTALLATION

Install per manufacturer's directions.

**\*\*END OF SECTION\*\***

SECTION 31 37 00  
RIP RAP

PART 1 - GENERAL

1.1 DESCRIPTION

The work of this section consists of furnishing and hand placing stone riprap for embankment protection.

1.2 SUBMITTALS

As specified in Section 01 33 00.

Submit Manufacturer's installation instructions for geotextile fabric.

PART 2 - PRODUCTS

2.1 GEOTEXTILE FABRIC

Fabric shall be permeable synthetic material, having the following properties:

2.1.1 Grab tensile strength, shall be 200 pounds minimum, tested by ASTM D1682-64.

2.1.2 Grab elongation shall be 15-50% as tested by ASTM D1682-64.

2.1.3 Burst strength shall be 500 lbs. as tested ASTM D751-79.

2.2 RIP RAP

Rip rap shall be well-graded angular quarry stones, sound and hard, resistant to water and weathering. Rock shall be Georgia D.O.T. Standard Specification, Latest Edition, Section 805 Type 3. Maximum size shall be 1.0 cubic foot. At least 35% of the mass shall be comprised of pieces which weigh 15 pounds or more.

PART 3 - EXECUTION

3.1 EXCAVATION

Excavate foundation as shown and as specified in Section 603.3 of the Georgia D.O.T. Standard Specifications, Latest Edition. Obtain Engineer's approval of foundation before placing geotextile fabric or riprap. Repair or replace fabric that has been damaged due to stone placement. Re-lay fabric that becomes displaced during stone placement.

3.2 GEOTEXTILE FABRIC

Place on smooth, uniform slope, loosely enough to conform to minor surface irregularities. Follow manufacturer's recommendations for making laps and for fastening and securing.

3.3 HANDLAID RIPRAP

Place largest rocks at bottom of slope. Arrange by hand to interlock and form a substantial bond. Rip rap shall be reasonably uniform and free from bulges, humps, or cavities. Use spalls to fill voids.

**\*\*END OF SECTION\*\***