

SECTION 31 25 13  
EROSION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes installing, maintaining and removing:
  - 1. Silt Fence.
  - 2. Temporary Construction Entrances.
  - 3. Diversion Channels.
  - 4. Sediment Traps.
  - 5. Rip Rap.
  - 6. Stone Check Dams.
  - 7. Inlet Protection.
  - 8. Site Stabilization.
  
- B. Related Sections:
  - 1. Section 31 10 00 - Site Clearing.
  - 2. Section 31 23 16 - Excavation and Fill.
  - 3. Section 31 37 00 - Riprap.
  - 4. Section 32 91 19 - Landscape Grading.
  - 5. Section 32 92 19 - Seeding and Soil Supplements.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials:
  - 1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-pound) rammer and a 457-mm (18-inch) drop.
  
- B. ASTM International:
  - 1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - 2. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  - 3. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
  - 4. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
  
- C. SCDOT Standard Specifications:
  - 1. Standard Specifications for Highway Construction, 2007, published by the South Carolina Department of Transportation.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
  
- B. Product Data: Submit data on geotextile, posts, woven wire, concrete mix design, and pipe.
  
- C. Manufacturer's Certificate: Certify products and aggregates meet or exceed specified requirements.

- D. Closeout Submittals: Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

#### 1.4 QUALITY ASSURANCE

- A. Standard of quality shall conform to the standards and practices set forth in: "South Carolina Storm water Management and Sedimentation Control Handbook for Land Disturbance Activities", February 1998 or latest edition.
- B. Maintain one copy of document on site.

#### 1.5 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this Section.

### PART 2 PRODUCTS

#### 2.1 GEOTEXTILE MATERIALS

- A. Engineering Fabric Materials: Non-biodegradable conforming to Section 815.02 of SCDOT Standard Specifications:
  - 1. Silt Fence: Type 3, Class A or B Engineering Fabric.
  - 2. Under Rip Rap or Construction Entrances: Type 2 Engineering Fabric.

#### 2.2 STONE, AGGREGATE, AND SOIL MATERIALS

- A. Stone for Sediment Trap and Check Dam: Class B erosion control stone conforming to Division 800 of the SCDOT Standard Specifications. Minimum size 5 inches, midrange size 8 inches, and maximum size 12 inches equally distributed.
- B. Stone for Rip Rap: Class 1 erosion control stone conforming to Division 800 of the SCDOT Standard Specifications. Minimum size 5 inches, midrange size 10 inches, and maximum size 17 inches equally distributed.
- C. Washed Stone: Coarse aggregate, Gradation No. 57 conforming to Division 800 of the SCDOT Standard Specifications.
- D. Aggregate for Construction Entrance: Coarse aggregate, Gradation No. 4 or larger with maximum size of 3 inch, conforming to Division 800 of the SCDOT Specifications.
- E. Soil Fill: Clean natural soil with a plasticity index of 15 or less that is free of clay, rock, or gravel lumps larger than 2 inches in any dimension; debris; waste; frozen material; and any other deleterious material that might cause settlement. Suitable material excavated from the site may be used as soil fill under optimum moisture conditions.

#### 2.3 PLANTING MATERIALS

- A. General: Conform to South Carolina rules and regulations as specified in Section 810 of the SCDOT Standard Specifications for seed, agricultural ground limestone, fertilizers, and mulch.
- B. Temporary Seed Mixture:
  - 1. Late winter and early spring: Rye and Annual Lespedeza (Kobe)

2. Summer: German Millet.
  3. Fall: Rye.
- C. Fertilizer: Commercial grade; recommended for grass.
- D. Lime: ASTM C602, Class O agricultural ground limestone containing a minimum 80 percent calcium carbonate equivalent.
- E. Mulch: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

## 2.4 CONCRETE

- A. Concrete: Class B concrete conforming to Section 701 of the SCDOT Standard Specifications.
1. Compressive strength of 2,500 psi at 28 days.
  2. Air entrained.
  3. Water cement ratio of 0.488 with rounded aggregate and 0.567 with angular aggregate.
  4. Maximum slump of 2.5 inches for vibrated concrete and 4 inches for non-vibrated concrete.
  5. Minimum cement content of 508 lbs per cubic yard for vibrated and 545 lbs per cubic yard for non-vibrated concrete.

## 2.5 PIPE MATERIALS

- A. Pipe: Corrugated steel pipe and fittings conforming to Section 715.2.3 of SCDOT Standard Specifications.

## 2.6 ACCESSORIES

- A. Posts for Silt Fence and Inlet Protection: Steel posts 5 feet long, 1-3/8 inches wide, minimum weight 1.25 lbs/ft. conforming to Section 815.4.6 of the SCDOT Standard Specifications.
- B. Woven Wire Fence for Silt Fence: Minimum 32 inches high, minimum 5 horizontal wires, vertical wires spaced 12 inches apart, minimum 10 gage top and bottom wires, and minimum 12-1/2 gage; all other wires conforming to Section 815 of the SCDOT Standard Specifications.
- C. Attachment Devices for Silt Fence: No. 9 staple, minimum 1-1/2 inches long, or other approved attachment devices.
- D. Hardware Cloth for Inlet Protection: 24 gage, 1/4-inch mesh opening hardware cloth.
- E. Trash Rack for Pipe Riser: Cone shaped with #4 bars welded at each intersection of bars and sized to fit pipe riser. Conform to Division 800 of the SCDOT Standard Specifications.

## 2.7 SOURCE QUALITY CONTROL (AND TESTS)

- A. Section 01 40 00 - Quality Requirements: Testing, inspection, and analysis requirements.
- B. Perform tests on cement, aggregates, and mixes to ensure conformance with specified requirements.

- C. Make rock available for inspection at producer's quarry prior to shipment. Notify Architect/Engineer at least seven days before inspection is allowed.
- D. Allow witnessing of inspections and tests at manufacturer's test facility. Notify Architect/Engineer at least seven days before inspections and tests are scheduled.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify compacted subgrade is acceptable and ready to support devices and imposed loads.
- C. Verify gradients and elevations of base or foundation for other work are correct.

### 3.2 SILT FENCE

- A. Install in accordance with Section 815 of the SCDOT Standard Specifications at locations shown on Drawings.
- B. Use wire fence with Class A fabric.
- C. Class B fabric may be used without woven wire backing subject to the following:
  - 1. Fabric is approved by Architect/Engineer.
  - 2. Maximum post spacing is 6 feet.
  - 3. Posts are inclined toward runoff source not more than 20 degrees from vertical.

### 3.3 TEMPORARY CONSTRUCTION ENTRANCES

- A. Excavate and compact subgrade as specified in Section 31 23 16.
- B. Install construction entrances to the dimensions and locations as shown on Drawings. Minimum thickness is 6 inches.
- C. Mound aggregate near intersection with public road to prevent site runoff entering road.
- D. Periodically dress entrances with 2-inch thick course aggregate when aggregate becomes clogged with soil.

### 3.4 DIVERSION CHANNELS

- A. Excavate channel as specified in Section 31 23 16.
- B. Windrow excavated material on low side of channel.
- C. Compact to 95 percent maximum density.
- D. On entire channel area, apply soil supplements and sow seed as specified in Section 32 92 19.
- E. Mulch seeded areas with hay as specified in Section 32 92 19.

### 3.5 SEDIMENT TRAPS

- A. Clear site as specified in Section 31 00 00.
- B. Construct trap by excavating and forming embankments as specified in Section 31 23 16.
- C. Place coarse aggregate or rock at outlet as indicated on Drawings.
- D. Place geotextile fabric as specified for rock lining.
- E. On entire sediment trap area, apply soil supplements and sow seed as specified in Section 32 92 19.
- F. Mulch seeded areas with hay as specified in Section 32 92 19.
- G. Clean trap of accumulated sediment when directed but no less than when trap is half full of sediment.

### 3.6 ROCK LINING (RIP RAP)

- A. Excavate to depth of rock lining as indicated on Drawings or nominal placement thickness as follows. Remove loose, unsuitable material below bottom of rock lining and replace with suitable material. Thoroughly compact and finish entire foundation area to firm, even surface.
- B. Lay and overlay geotextile fabric over substrate. Lay fabric parallel to flow from upstream to downstream. Overlap edges upstream over downstream and upslope over downslope. Provide a minimum overlap of 3 feet. Offset adjacent roll ends a minimum of 5 feet when lapped. Cover fabric as soon as possible and in no case leave fabric exposed more than 4 weeks.
- C. Carefully place rock on geotextile fabric to produce an even distribution of pieces with minimum of voids and without tearing geotextile.
- D. Unless indicated otherwise, place full course thickness in one operation to prevent segregation and avoid displacement of underlying material. Arrange individual rocks for uniform distribution.

### 3.7 STONE CHECK DAM

- A. Determine length required for ditch or depression slope and excavate, backfill, and compact foundation area to firm, even surface.
- B. Place Class B erosion control stone in an even distribution of rock pieces with minimum voids to the indicated shape, height, and slope.
- C. Construct washed stone filter blanket against upstream face of stone check dam to the thickness indicated on Drawings.

### 3.8 INLET PROTECTION

- A. Install four posts around drainage structure and attach hardware cloth as indicated on Drawings.
- B. Place Class B erosion control stone at base of fabric and mound at approximately 2:1.

- C. Place washed stone filter blanket on upstream side(s).

### 3.9 SITE STABILIZATION

- A. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time.
- B. Construct, stabilize, and activate erosion controls before site disturbance within tributary areas of those controls.
- C. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 2:1 or flatter.
- D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.
  - 1. During non-germinating periods, apply mulch at recommended rates.
  - 2. Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Section 32 92 19 at 75 percent of permanent application rate with no topsoil.
  - 3. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with Section 32 92 19 permanent seeding specifications.
- E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

### 3.10 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.
- C. Perform laboratory material tests in accordance with ASTM D1557 or AASHTO T180.
- D. Perform in place compaction tests in accordance with the following:
  - 1. Density Tests: ASTM D1556, ASTM D2167, or ASTM D2922.
  - 2. Moisture Tests: ASTM D3017.
- E. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.
- F. Frequency of Tests: Twice per lift for every 10,000 square feet.

### 3.11 CLEANING

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.
- B. When sediment accumulation in sedimentation structures has reached a point one-half depth of sediment structure or device, remove and dispose of sediment.
- C. Do not damage structure or device during cleaning operations.
- D. Do not permit sediment to erode into construction or site areas or natural waterways.

- E. Clean channels when depth of sediment reaches approximately one-half channel depth.

3.12 SCHEDULES

- A. Erosion Control Schedule:

<b>Erosion Control Element</b>	<b>Location</b>	<b>Size</b>
Silt Fence		
Temporary Construction Entrance		
Diversion Channel		
Sediment Trap		
Rock Lining (Rip Rap)		
Stone Check Dams		
Inlet Protection		
Sediment Pond		

END OF SECTION