

U-3826

**Project Special Provisions  
Erosion Control**

Edgecombe County

**SEEDING AND MULCHING:****(East)**

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

## All Roadway Areas

**March 1 - August 31**

|       |                       |
|-------|-----------------------|
| 50#   | Tall Fescue           |
| 10#   | Centipede             |
| 25#   | Bermudagrass (hulled) |
| 500#  | Fertilizer            |
| 4000# | Limestone             |

**September 1 - February 28**

|       |                         |
|-------|-------------------------|
| 50#   | Tall Fescue             |
| 10#   | Centipede               |
| 35#   | Bermudagrass (unhulled) |
| 500#  | Fertilizer              |
| 4000# | Limestone               |

## Waste and Borrow Locations

**March 1 - August 31**

|       |                       |
|-------|-----------------------|
| 75#   | Tall Fescue           |
| 25#   | Bermudagrass (hulled) |
| 500#  | Fertilizer            |
| 4000# | Limestone             |

**September 1 - February 28**

|       |                         |
|-------|-------------------------|
| 75#   | Tall Fescue             |
| 35#   | Bermudagrass (unhulled) |
| 500#  | Fertilizer              |
| 4000# | Limestone               |

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

## Approved Tall Fescue Cultivars

|                            |                        |              |                    |
|----------------------------|------------------------|--------------|--------------------|
| 2 <sup>nd</sup> Millennium | Duster                 | Magellan     | Rendition          |
| Avenger                    | Endeavor               | Masterpiece  | Scorpion           |
| Barlexas                   | Escalade               | Matador      | Shelby             |
| Barlexas II                | Falcon II, III, IV & V | Matador GT   | Signia             |
| Barrera                    | Fidelity               | Millennium   | Silverstar         |
| Barrington                 | Finesse II             | Montauk      | Southern Choice II |
| Biltmore                   | Firebird               | Mustang 3    | Stetson            |
| Bingo                      | Focus                  | Olympic Gold | Tarheel            |
| Bravo                      | Grande II              | Padre        | Titan Ltd          |
| Cayenne                    | Greenkeeper            | Paraiso      | Titanium           |
| Chapel Hill                | Greystone              | Picasso      | Tomahawk           |
| 4 Chesapeake               | Inferno                | Piedmont     | Tacer              |
| Constitution               | Justice                | Pure Gold    | Trooper            |
| Chipper                    | Jaguar 3               | Prospect     | Turbo              |
| Coronado                   | Kalahari               | Quest        | Ultimate           |
| Coyote                     | Kentucky 31            | Rebel Exeda  | Watchdog           |

75

|          |                 |              |          |
|----------|-----------------|--------------|----------|
| Davinci  | Kitty Hawk      | Rebel Sentry | Wolfpack |
| Dynasty  | Kitty Hawk 2000 | Regiment II  |          |
| Dominion | Lexington       | Rembrandt    |          |

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

### **Native Grass Seeding and Mulching**

### **Bermuda**

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands and riparian areas, and adjacent to Stream Relocation construction within a 50 foot zone on both sides of the stream or depression, measured from top of stream bank or center of depression. The stream bank of the stream relocation shall be seeded by a method that does not alter the typical cross section of the stream bank. Native Grass Seeding and Mulching shall also be performed in the permanent soil reinforcement mat section of preformed scour holes, and in other areas as directed.

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

#### **March 1 - August 31**

|       |                       |
|-------|-----------------------|
| 25#   | Bermudagrass (hulled) |
| 6#    | Indiangrass           |
| 8#    | Little Bluestem       |
| 4#    | Switchgrass           |
| 25#   | Browntop Millet       |
| 500#  | Fertilizer            |
| 4000# | Limestone             |

#### **September 1 - February 28**

|       |                         |
|-------|-------------------------|
| 35#   | Bermudagrass (unhulled) |
| 6#    | Indiangrass             |
| 8#    | Little Bluestem         |
| 4#    | Switchgrass             |
| 35#   | Rye Grain               |
| 500#  | Fertilizer              |
| 4000# | Limestone               |

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

Native Grass Seeding and Mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

### **Measurement and Payment**

Native Grass *Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

All areas seeded and mulched shall be tacked with asphalt. Crimping of straw in lieu of asphalt tack shall not be allowed on this project.

**CRIMPING STRAW MULCH:**

Crimping shall be required on this project adjacent to any section of roadway where traffic is to be maintained or allowed during construction. In areas within six feet of the edge of pavement, straw is to be applied and then crimped. After the crimping operation is complete, an additional application of straw shall be applied and immediately tacked with a sufficient amount of undiluted emulsified asphalt.

Straw mulch shall be of sufficient length and quality to withstand the crimping operation.

Crimping equipment including power source shall be subject to the approval of the Engineer providing that maximum spacing of crimper blades shall not exceed 8".

**TEMPORARY SEEDING:**

Fertilizer shall be the same analysis as specified for *Seeding and Mulching* and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet or Browntop Millet shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

**FERTILIZER TOPDRESSING:**

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

**SUPPLEMENTAL SEEDING:**

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as

to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

### **MOWING:**

The minimum mowing height on this project shall be 4 inches.

### **SPECIALIZED HAND MOWING:**

#### **Description**

This work consists of specialized hand mowing around or under fixed objects, including but not limited to guardrails, signs, barriers and slopes in a method acceptable to the Engineer.

Specialized hand mowing shall be completed with mechanically powered trimmers, string trimmers, hand operated rotary mowers, or self-propelled mowers of sufficient size and quality to perform the work timely and efficiently.

The quantity of mowing to be performed will be affected by the actual conditions that occur during the construction of the project. The quantity of mowing may be increased, decreased or eliminated entirely as directed. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

#### **Measurement and Payment**

*Specialized Hand Mowing* will be measured and paid for as the actual number of man hours worked while hand mowing along the surface of the ground, as directed. Where an area has been mowed more than once, as directed, separate measurement will be made each time the area is mowed.

Payment will be made under:

| <b>Pay Item</b>         | <b>Pay Unit</b> |
|-------------------------|-----------------|
| Specialized Hand Mowing | MHR             |

### **REFORESTATION:**

#### **Description**

*Reforestation* will be planted within interchanges and along the outside borders of the road, and in other areas as directed. *Reforestation* is not shown on the plan sheets. See the Reforestation Detail Sheet.

All non-maintained riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated with native woody species.

The entire *Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

### **Materials**

*Reforestation* shall be bare root seedlings 12"-18" tall.

### **Construction Methods**

*Reforestation* shall be planted as soon as practical following permanent *Seeding and Mulching*. The seedlings shall be planted in a 16-foot wide swath adjacent to mowing pattern line, or as directed.

Root dip: The roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay (kaolin) or a superabsorbent that is designated as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal Limitations: *Reforestation* shall be planted from November 15 through March 15.

### **Measurement and Payment**

*Reforestation* will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

## **WETLAND REFORESTATION:**

### **Description**

*Wetland Reforestation* will be planted in areas designated on the plans and as directed. See the Wetland Reforestation Detail Sheet.

The entire *Wetland Reforestation* operation shall comply with the requirements of Section 1670 of the *Standard Specifications*.

### **Materials**

*Wetland Reforestation* shall be bare root seedlings 12"-18" tall.

### **Construction Methods**

*Wetland Reforestation* shall be planted as soon as practical following permanent seeding and mulching. The seedlings shall be planted in a minimum of two rows of trees between the slope stake line and the clearing limits.

Root dip: the roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay ("kaolin") or a superabsorbent that is made to be used as a bare root dip. The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Seasonal limitations: *Wetland Reforestation* shall be planted from November 15 through March 15.

### **Measurement and Payment**

*Wetland Reforestation* will be measured and paid for in accordance with Article 1670-17 of the *Standard Specifications*.

### **DISKING:**

#### **Description**

Upon completion of *Ripping*, *Disking* shall be performed in all areas shown on the plans or as directed.

#### **Materials**

The disk harrow equipment shall be either a tandem disk harrow or an offset disk harrow with 20" blades minimum, spaced a maximum of 9" apart. The disk harrow shall have a minimum of 18 blades, and shall be of sufficient weight and size to provide an 8" minimum cutting depth. The tractor used to perform this work shall be of sufficient size and horsepower capable of pulling this implement to the minimum specifications stated above.

### **Construction Methods**

The areas previously ripped shall be disked to a minimum depth of 8" and shall provide adequate mixing of vegetation debris into the soil.

### Measurement and Payment

*Disking* will be measured and paid for as the actual number of acres measured along the surface of the ground, which has been disked.

Payment will be made under:

| <b>Pay Item</b> | <b>Pay Unit</b> |
|-----------------|-----------------|
| Disking         | Acre            |

### RIPPING:

#### Description

This work consists of ripping the areas graded for planting with wetland reforestation with a v ripper tillage tool.

#### Materials

The v ripper tillage tool shall have a minimum of three shanks spaced a maximum of 20" apart and have shanks of sufficient length capable of providing a minimum depth of 15 inches. The tractor used to perform this work shall be of sufficient size and horsepower capable of pulling this implement to the minimum specifications stated above.

#### Construction Methods

Upon completion of grading, the areas to be planted with wetland reforestation shall be ripped with a v ripper tillage tool to a minimum depth of 15 inches. Each sequential swath of the equipment shall be consistent in spacing and shall have a maximum of 20" between swaths.

### Measurement and Payment

*Ripping* will be measured and paid for as the actual number of acres measured along the surface of the ground, which has been ripped.

Payment will be made under:

| <b>Pay Item</b> | <b>Pay Unit</b> |
|-----------------|-----------------|
| Ripping         | Acre            |

**RESPONSE FOR EROSION CONTROL:****Description**

Furnish the labor, materials, tools and equipment necessary to move personnel, equipment, and supplies to the project necessary for the pursuit of any or all of the following work as shown herein, by an approved subcontractor.

- (A) Seeding and Mulching
- (B) Temporary Seeding and Mulching
- (C) Temporary Mulching
- (D) Fertilizer Topdressing
- (E) Repair Seeding
- (F) Supplemental Seeding
- (G) Silt Fence Installation or Repair
- (H) Installation of Matting for Erosion Control

**Construction Methods**

Provide an approved subcontractor who performs an erosion control action as described in Form 1675. Each erosion control action may include one or more of the above work items.

**Measurement and Payment**

*Response for Erosion Control* will be measured and paid for by counting the actual number of times the subcontractor moves onto the project, including borrow and waste sites, and satisfactorily completes an erosion control action described in Form 1675. The provisions of Article 104-5 of the *Standard Specifications* will not apply to this item of work.

Payment will be made under:

| <b>Pay Item</b>              | <b>Pay Unit</b> |
|------------------------------|-----------------|
| Response for Erosion Control | Each            |

**ENVIRONMENTALLY SENSITIVE AREAS:****Description**

This project is located in an *Environmentally Sensitive Area*. This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the Environmentally Sensitive Areas identified on the plans and as designated by the Engineer. This also requires special procedures to be used for seeding and mulching and staged seeding within the project.

The Environmentally Sensitive Area shall be defined as a 50-foot buffer zone on both sides of the stream or depression measured from top of streambank or center of depression.

### **Construction Methods**

(A) Clearing and Grubbing

In areas identified as Environmentally Sensitive Areas, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Article 200-1 of the *Standard Specifications*. Only clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

(B) Grading

Once grading operations begin in identified Environmentally Sensitive Areas, work shall progress in a continuous manner until complete. All construction within these areas shall progress in a continuous manner such that each phase is complete and areas are permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in Environmentally Sensitive Areas will be just cause for the Engineer to direct the suspension of work in accordance with Article 108-7 of the *Standard Specifications*.

(C) Temporary Stream Crossings

Any crossing of streams within the limits of this project shall be accomplished in accordance with the requirements of Subarticle 107-13(B) of the *Standard Specifications*.

(D) Seeding and Mulching

Seeding and mulching shall be performed in accordance with Section 1660 of the *Standard Specifications* and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the Environmentally Sensitive Areas.

(E) Stage Seeding

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be

done in stages on cut and fill slopes that are greater than 20 feet in height measured along the slope, or greater than 2 acres in area. Each stage shall not exceed the limits stated above.

Additional payments will not be made for the requirements of this section, as the cost for this work shall be included in the contract unit prices for the work involved.

**MINIMIZE REMOVAL OF VEGETATION:**

The Contractor shall minimize removal of vegetation at stream banks and disturbed areas within the project limits as directed.

**STOCKPILE AREAS:**

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed.

**ACCESS AND HAUL ROADS:**

At the end of each working day, the Contractor shall install or re-establish temporary diversions or earth berms across access/haul roads to direct runoff into sediment devices. Silt fence sections that are temporarily removed shall be reinstalled across access/haul roads at the end of each working day.

**WASTE AND BORROW SOURCES:**

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices that may be required on a commercial borrow or waste site will be done at the Contractor's expense.

**GRAVEL CONSTRUCTION ENTRANCE:**

**Description**

This work consists of furnishing, installing, and maintaining and removing any and all material required for the construction of a *Gravel Construction Entrance*.

## Materials

Refer to Division 10

| Item                               | Section |
|------------------------------------|---------|
| Filter Fabric for Drainage, Type 2 | 1056    |
| Stone for Erosion Control, Class A | 1042    |

## Construction Methods

The Contractor shall install a Gravel Construction Entrance in accordance with Standard Drawing No. 1607.01 and at locations as directed.

## Measurement and Payment

*Filter Fabric for Drainage* will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications*.

*Stone for Erosion Control, Class \_\_* will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

Such price and payment shall be considered full compensation for all work covered by this section including all materials, construction, maintenance, and removal of Gravel Construction Entrance.

## TEMPORARY DIVERSION:

This work consists of installation, maintenance, and cleanout of *Temporary Diversions* in accordance with Section 1630 of the *Standard Specifications*. The quantity of excavation for installation and cleanout will be measured and paid for as *Silt Excavation* in accordance with Article 1630-4 of the *Standard Specifications*.

## SPECIAL SEDIMENT CONTROL FENCE:

### Description

This work consists of the construction, maintenance, and removal of *Special Sediment Control Fence*. Place special sediment control fence as shown on the plans or as directed.

### Materials

#### (A) Posts

Steel posts shall be at least 5 ft. in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square

inches, and shall have a means of retaining wire in the desired position without displacement.

(B) ¼" Hardware Cloth

Hardware cloth shall have ¼" openings constructed from #24 gauge wire. Install hardware cloth in accordance with Standard Drawing No. 1606.01.

(C) Sediment Control Stone

Sediment Control Stone shall meet the requirements of Section 1005 of the *Standard Specifications*. Install stone in accordance with Standard Drawing No. 1606.01.

### **Construction Methods**

The Contractor shall maintain the special sediment control fence until the project is accepted or until the fence is removed, and shall remove and dispose of silt accumulations at the fence when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

### **Measurement and Payment**

¼" *Hardware Cloth* will be measured and paid for in accordance with Article 1632-5 of the *Standard Specifications*.

*Sediment Control Stone* will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

### **SAFETY FENCE:**

#### **Description**

*Safety Fence* shall consist of furnishing, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland or water. The fence shall be installed prior to any land disturbing activities.

#### **Materials**

Polyethylene or polypropylene fence shall be a highly visible preconstructed safety fence approved by the Engineer. The fence material shall have an ultraviolet coating.

Either wood posts or steel posts may be used. Wood posts shall be hardwood with a wedge or pencil tip at one end, and shall be at least 5 ft. in length with a minimum

nominal 2" x 2" cross section. Steel posts shall be at least 5 ft. in length, and have a minimum weight of 0.85 lb./ft. of length.

### **Construction Methods**

No additional clearing and grubbing is anticipated for the installation of this fence; however, if any clearing and grubbing is required, it will be the minimum required for the installation of the safety fence. Such clearing shall include satisfactory removal and disposal of all trees, brush, stumps and other objectionable material.

The fence shall be erected to conform to the general contour of the ground. When determined necessary, minor grading along the fence line shall be performed to meet this requirement provided no obstructions to proper drainage are created.

Posts shall be set and maintained in a vertical position and may be hand set or set with a post driver. If hand set, all backfill material shall be thoroughly tamped. Wood posts may be sharpened to a dull point if power driven. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30-degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence fabric shall be attached to the wood posts with one 2" galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

### **Measurement and Payment**

*Safety Fence* will be measured and paid for as the actual number of linear feet installed in place and accepted. Such payment will be full compensation including but not limited to clearing and grading, furnishing and installing fence fabric with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete this work.

Payment will be made under:

| <b>Pay Item</b> | <b>Pay Unit</b> |
|-----------------|-----------------|
| Safety Fence    | Linear Foot     |

### **PERMANENT SOIL REINFORCEMENT MAT:**

#### **Description**

This work consists of furnishing and placing *Permanent Soil Reinforcement Mat*, of the type specified, over previously prepared areas as directed.

## Materials

The product shall be a permanent erosion control reinforcement mat and shall be constructed of synthetic or a combination of coconut and synthetic fibers evenly distributed throughout the mat between a bottom UV stabilized netting and a heavy duty UV stabilized top net. The matting shall be stitched together with UV stabilized polypropylene thread to form a permanent three-dimensional structure. The mat shall have the following minimum physical properties:

| Property                                     | Test Method            | Value | Unit               |
|--|------------------------|-------|--------------------|
| Light Penetration                            | ASTM D6567             | 9     | %                  |
| Thickness                                    | ASTM D6525             | 0.40  | in                 |
| Mass Per Unit Area                           | ASTM D6566             | 0.55  | lb/sy              |
| Tensile Strength                             | ASTM D6818             | 385   | lb/ft              |
| Elongation (Maximum)                         | ASTM D6818             | 49    | %                  |
| Resiliency                                   | ASTM D1777             | >70   | %                  |
| UV Stability *                               | ASTM D4355             | ≥80   | %                  |
| Porosity (Permanent Net)                     | ECTC Guidelines        | ≥85   | %                  |
| Maximum Permissible Shear Stress (Vegetated) | Performance Bench Test | ≥8.0  | lb/ft <sup>2</sup> |
| Maximum Allowable Velocity (Vegetated)       | Performance Bench Test | ≥16.0 | ft/s               |

\*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure.

Submit a certification (Type 1, 2, or 3) from the manufacturer showing:

- (A) the chemical and physical properties of the mat used, and
- (B) conformance of the mat with this specification.

## Construction Methods

Matting shall be installed in accordance with Subarticle 1631-3(B) of the *Standard Specifications*.

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660 of the *Standard Specifications*. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

## Measurement and Payment

*Permanent Soil Reinforcement Mat* will be measured and paid for as the actual number of square yards measured along the surface of the ground over which Permanent Soil Reinforcement Mat is installed and accepted. Overlaps will not be included in the

measurement, and will be considered as incidental to the work. Such payment shall be full compensation for furnishing and installing the mat, including overlaps, and for all required maintenance.

Payment will be made under:

| <b>Pay Item</b>                  | <b>Pay Unit</b> |
|----------------------------------|-----------------|
| Permanent Soil Reinforcement Mat | Square Yard     |

### **COIR FIBER BAFFLE:**

#### **Description**

Furnish material, install and maintain coir fiber baffles according to the details in the plans or in locations as directed. Coir Fiber Baffles shall be installed in silt basins and sediment dams at drainage outlets. Work includes providing all materials, placing, securing, excavating and backfilling of *Coir Fiber Baffles*.

#### **Materials**

##### (A) Coir Fiber Mat

Matting: Provide matting to meet the following requirements:

|   |                          |
|---|--------------------------|
| 100% coconut fiber (coir) twine woven into high strength matrix |                          |
| Thickness -   | 0.30 in. minimum         |
| Tensile Strength  | 1348 x 626 lb/ft minimum |
| Elongation  | 34% x 38% maximum        |
| Flexibility (mg-cm)   | 65030 x 29590            |
| Flow Velocity   | Observed 11 ft/sec       |
| Weight  | 20 oz/SY                 |
| Size  | 6.6 x 164 ft (120 SY)    |
| "C" Factor  | 0.002                    |
| Open Area (measured)  | 50%                      |

##### (B) Staples

Provide staples made of 0.125 in. diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

##### (C) Posts

Steel posts shall be at least 5 ft. in length, approximately 1 3/8" wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall be of the self-fastener angle steel type to have a means of retaining wire and coir fiber mat in the desired position without displacement.

**(D) Wire**

Provide 9-gauge high tension wire strand of variable lengths.

**Construction Methods**

Place the coir fiber baffles immediately upon excavation of basins. Install three (3) baffles in basins with a spacing of one fourth (1/4) the basin length and according to the detail sheets. Two (2) coir fiber baffles shall be installed in basins less than 20 ft. in length with a spacing of one third (1/3) the basin length.

Steel posts shall be placed at a depth of 2 ft. below the basin surface, with a maximum spacing of 4 ft. The top height of the coir fiber baffles shall not be below the elevation of the emergency spillway base of dams and basins. Attach a 9-gauge high-tension wire strand to the steel posts at a height of 3 ft. with plastic ties or wire fasteners. Install a steel post into side of the basin at a variable depth and a height of 3 ft. from the bottom of the basin to anchor coir fiber mat. Secure anchor post to the upright steel post in basin with wire fasteners.

The coir fiber mat shall be draped over the wire strand to a minimum of 3 ft. of material on each side of the strand. Secure the coir fiber mat to the wire strand with plastic ties or wire fasteners. Place staples across the matting at ends and junctions approximately 1 ft. apart at the bottom and side slopes of basin. Overlap matting at least 6" where 2 or more widths of matting are installed side by side. Refer to details in the plan sheets. The Engineer may require adjustments in the stapling requirements to fit individual site conditions.

**Measurement and Payment**

*Coir Fiber Baffles* will be measured and paid for by the actual number of linear feet of coir fiber baffles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the coir fiber baffles.

Payment will be made under:

| <b>Pay Item</b>   | <b>Pay Unit</b> |
|-------------------|-----------------|
| Coir Fiber Baffle | Linear Foot     |

**SKIMMER BASIN WITH BAFFLES:****Description**

Provide a skimmer basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Skimmer Basin with Baffles Detail sheet

provided in the erosion control plans. Work includes constructing sediment basin, installation of temporary slope drain pipe and coir fiber baffles, installation and furnishing of Faircloth Skimmers or other approved equivalent device, providing and placing stone pad on bottom of basin underneath skimmer device, providing and placing filter fabric emergency spillway liner, providing coir fiber mat stabilization for the skimmer outlet, disposing of excess materials, removing temporary slope drain, coir fiber baffles, filter fabric liner and skimmer device, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

## Materials

| Item                               | Section |
|------------------------------------|---------|
| Stone for Erosion Control, Class B | 1042    |
| Filter Fabric for Drainage, Type 2 | 1056    |
| Fertilizer for Temporary Seeding   | 1060-2  |
| Seed for Temporary Seeding         | 1060-4  |
| Seeding and Mulching               | 1060-4  |
| Matting for Erosion Control        | 1060-8  |
| Staples                            | 1060-8  |
| Temporary Slope Drain              | 1622-2  |

*Coir Fiber Baffles* shall meet the specifications as provided elsewhere in this contract.

Provide appropriately sized Faircloth skimmer or other approved equivalent device.

Provide 4" Schedule 40 PVC pipe to attach to coupling connection of Faircloth skimmer.

Coir Fiber Mat: Coir fiber matting for stabilization of the skimmer outlet shall meet the following requirements:

|   |                          |
|---|--------------------------|
| 100% coconut fiber (coir) twine woven into high strength matrix |                          |
| Thickness -   | 0.30 in. minimum         |
| Tensile Strength  | 1348 x 626 lb/ft minimum |
| Elongation  | 34% x 38% maximum        |
| Flexibility (mg-cm)   | 65030 x 29590            |
| Flow Velocity   | Observed 11 ft/sec       |
| Weight  | 20 oz/SY                 |
| Size  | 6.6 x 164 ft (120 SY)    |
| "C" Factor  | 0.002                    |
| Open Area (measured)  | 50%                      |

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

### Wooden Stakes:

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving

through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

#### Steel Reinforcement Bars:

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

#### Staples:

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

### Construction Methods

Excavate basin according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Install temporary slope drain pipe and construct the emergency spillway according to the Skimmer Basin with Baffles Detail sheet in the erosion control plans. Construct the coir fiber baffles according to the details in the plans and as provided elsewhere in this contract.

Install Faircloth skimmer or other approved equivalent device according to manufacturer recommendations. Install 4" Schedule 40 PVC pipe into dam on the lower side of basin according to the detail, and attach the coupling connection of Faircloth skimmer according to manufacturer recommendations. Attach the rope included with the skimmer to the tee between the vent socket and the tube inlet, and the other end to a wooden stake or metal post. Construct a stone pad of Class B stone directly underneath the skimmer device at bottom of basin. The pad shall be a minimum of 12" in height, and shall have a minimum cross sectional area of 4 ft. by 4 ft.

Line emergency spillway with filter fabric unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of fabric in a trench at least 5" deep and tamp firmly. Make vertical overlaps a minimum of 18" with upstream fabric overlapping the downstream fabric. Secure fabric with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the fabric a maximum of 3 ft. horizontally and vertically. Filter fabric shall be placed to the bottom and across the entire width of the basin according to the Skimmer Basin with Baffles detail.

At the skimmer outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends

approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

All bare side slope sections of the skimmer basin shall be seeded with a temporary or permanent seed mix as directed and in accordance with Articles 1620-3, 1620-4, 1620-5, 1660-4, 1660-5 and 1660-7 of the *Standard Specifications*. Straw or excelsior matting shall be installed on all bare side slope sections immediately upon the completion of seeding and in accordance with Article 1631-3(B) of the *Standard Specifications*.

### **Measurement and Payment**

*Silt Excavation* will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

*Filter Fabric for Drainage* will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications*.

*Coir Fiber Baffles* will be measured and paid for as provided elsewhere in this contract.

\_\_\_" *Skimmer* will be measured in units of each. \_\_\_" *Skimmer* will be measured and paid for as the maximum number of each size skimmer acceptably installed and in use at any one time during the life of the project. Relocation and reinstallation of \_\_\_" *Skimmer* is considered incidental to the measurement of the quantity of \_\_\_" *Skimmer* and no separate payment will be made.

*Coir Fiber Mat* will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

*Temporary Slope Drain* will be measured and paid for in accordance with Article 1622-4 of the *Standard Specifications*.

*Stone for Erosion Control, Class \_\_\_* will be measured and paid for in accordance with Article 1610-4 of the *Standard Specifications*.

*Seeding and Mulching* will be measured and paid for in accordance with Article 1660-8 of the *Standard Specifications*.

*Seed for Temporary Seeding* will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

*Fertilizer for Temporary Seeding* will be measured and paid for in accordance with Article 1620-6 of the *Standard Specifications*.

*Matting for Erosion Control* will be measured and paid for in accordance with Article 1631-4 of the *Standard Specifications*.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

| <b>Pay Item</b> | <b>Pay Unit</b> |
|-----------------|-----------------|
| __" Skimmer     | Each            |
| Coir Fiber Mat  | Square Yard     |

### **INFILTRATION BASIN WITH BAFFLES:**

#### **Description**

Provide an infiltration basin to remove sediment from construction site runoff at locations shown in the erosion control plans. See the Infiltration Basin with Baffles Detail sheet provided in the erosion control plans. Work includes constructing sediment basin, installation of coir fiber baffles, providing and placing filter fabric emergency spillway liner, providing coir fiber mat stabilization for the emergency spillway outlet, disposing of excess materials, removing filter fabric liner and coir fiber mat, backfilling basin area with suitable material and providing proper drainage when basin area is abandoned.

#### **Materials**

| <b>Item</b>                        | <b>Section</b> |
|------------------------------------|----------------|
| Filter Fabric for Drainage, Type 2 | 1056           |
| Staples                            | 1060-8         |

*Coir Fiber Baffles* shall meet the specifications as provided elsewhere in this contract.

*Coir Fiber Mat*: Coir fiber matting for stabilization of the emergency spillway outlet shall meet the following requirements:

|   |                          |
|---|--------------------------|
| 100% coconut fiber (coir) twine woven into high strength matrix |                          |
| Thickness -   | 0.30 in. minimum         |
| Tensile Strength  | 1348 x 626 lb/ft minimum |
| Elongation  | 34% x 38% maximum        |
| Flexibility (mg-cm)   | 65030 x 29590            |
| Flow Velocity   | Observed 11 ft/sec       |
| Weight  | 20 oz/SY                 |
| Size  | 6.6 x 164 ft (120 SY)    |
| "C" Factor  | 0.002                    |
| Open Area (measured)  | 50%                      |

Anchors: Staples, stakes, or reinforcement bars shall be used as anchors.

**Wooden Stakes:**

Provide hardwood stakes 12"- 24" long with a 2" x 2" nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving through the coir fiber mat and down into the underlying soil. The other end of the stake needs to have a 1"- 2" long head at the top with a 1"- 2" notch following to catch and secure the coir fiber mat.

**Steel Reinforcement Bars:**

Provide uncoated #10 steel reinforcement bars 24" nominal length. The bars shall have a 4" diameter bend at one end with a 4" straight section at the tip to catch and secure the coir fiber mat.

**Staples:**

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

**Construction Methods**

Excavate basin according to the erosion control plans with basin surface free of obstructions, debris, and pockets of low-density material. Excavation into or below the water table shall not occur, and avoid compacting the bottom of the basin with equipment tires, excavation bucket, etc. Construct the coir fiber baffles according to the details in the plans and as provided elsewhere in this contract. Construct earth berm around perimeter of infiltration basin as shown in the detail and the earth berm height shall be limited to 3 ft.

Construct the emergency spillway according to the Infiltration Basin with Baffles Detail sheet in the erosion control plans. Line emergency spillway with filter fabric unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury edges of fabric in a trench at least 5" deep and tamp firmly. Make vertical overlaps a minimum of 18" with upstream fabric overlapping the downstream fabric. Secure fabric with eleven gauge wire staples shaped into a *u* shape with a length of not less than 12" and a throat not less than 1" in width. Place staples along outer edges and throughout the fabric a maximum of 3 ft. horizontally and vertically. Filter fabric shall be placed to the bottom and across the entire width of the basin according to the Skimmer Basin with Baffles detail.

At the emergency spillway outlet, provide a smooth soil surface free from stones, clods, or debris that will prevent contact of the coir fiber matting with the soil. Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Wooden stakes, reinforcement bars, or staples may be used as anchors in accordance with the details in the plans and as directed. Place anchors across the matting at the ends approximately 1 ft. apart. Place anchors along the outer edges and down the center of the matting 3 ft. apart.

## Measurement and Payment

*Silt Excavation* will be measured and paid for in accordance with Article 1630-4 of the *Standard Specifications*, as calculated from the typical section throughout the length of the basin as shown on the final approved plans.

*Filter Fabric for Drainage* will be measured and paid for in accordance with Article 876-4 of the *Standard Specifications*.

*Coir Fiber Baffles* will be measured and paid for as provided elsewhere in this contract.

*Coir Fiber Mat* will be measured and paid for as the actual number of square yards measured along the surface of the ground over which coir fiber mat is installed and accepted.

No measurement will be made for other items or for over excavation or stockpiling.

Payment will be made under:

| <b>Pay Item</b> | <b>Pay Unit</b> |
|-----------------|-----------------|
| Coir Fiber Mat  | Square Yard     |

## **WATTLES WITH POLYACRYLAMIDE (PAM):**

### **Description**

Wattles are tubular products consisting of excelsior fibers encased in synthetic netting. Wattles are used on slopes or channels to intercept runoff and act as a velocity break. Wattles are to be placed at locations shown on the plans or as directed. Installation shall follow the detail provided in the plans and as directed. Work includes furnishing materials, installation of wattles, matting installation, PAM application, and removing wattles.

### **Materials**

Wattle shall meet the following specifications:

|                                    |                                  |
|------------------------------------|----------------------------------|
| 100% Curled Wood(Excelsior) Fibers |                                  |
| Minimum Diameter                   | 12 in.                           |
| Minimum Density                    | 2.5 lb/ft <sup>3</sup> +/- 10%   |
| Net Material                       | Synthetic                        |
| Net Openings                       | 1 in. x 1 in.                    |
| Net Configuration                  | Totally Encased                  |
| Minimum Weight                     | 20 lb. +/- 10% per 10 ft. length |

Anchors: Stakes shall be used as anchors.

**Wooden Stakes:**

Provide hardwood stakes a minimum of 2-ft. long with a 2 in. x 2 in. nominal square cross section. One end of the stake must be sharpened or beveled to facilitate driving down into the underlying soil.

Matting shall meet the requirements of section 1060-8 of the *Standard Specifications*, or shall meet specifications provided elsewhere in this contract.

Provide staples made of 0.125" diameter new steel wire formed into a *u* shape not less than 12" in length with a throat of 1" in width.

Polyacrylamide (PAM) shall be applied in powder form and shall be anionic or neutrally charged. Soil samples shall be obtained in areas where the wattles will be placed, and from offsite material used to construct the roadway, and analyzed for the appropriate PAM flocculant to be utilized with each wattle.

**Construction Methods**

Wattles shall be secured to the soil by wire staples approximately every 1 linear foot and at the end of each section of wattle. A minimum of 4 stakes shall be installed on the downstream side of the wattle with a maximum spacing of 2 linear feet along the wattle, and according to the detail. Install a minimum of 2 stakes on the upstream side of the wattle according to the detail provided in the plans. Stakes shall be driven into the ground a minimum of 10 in. with no more than 2 in. projecting from the top of the wattle. Drive stakes at an angle according to the detail provided in the plans.

Only install wattle(s) to a height in ditch so flow will not wash around wattle and scour ditch slopes and according to the detail provided in the plans and as directed. Overlap adjoining sections of wattles a minimum of 6 in.

Installation of matting shall be in accordance with the detail provided in the plans, and in accordance with section 1631-3(B) of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

Apply PAM over the lower center portion of the wattle where the water is going to flow over at a rate of 3.5 ounces per wattle. PAM applications shall be done during construction activities after every rainfall event that is equal to or exceeds 0.50 in.

The Contractor shall maintain the wattles until the project is accepted or until the wattles are removed, and shall remove and dispose of silt accumulations at the wattles when so directed in accordance with the requirements of Section 1630 of the *Standard Specifications*.

## Measurement and Payment

*Wattles* will be measured and paid for by the actual number of linear feet of wattles which are installed and accepted. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to install the *Wattles*.

Matting will be measured and paid for in accordance with section 1631-4 of the *Standard Specifications*, or in accordance with specifications provided elsewhere in this contract.

*Polyacrylamide(PAM)* will be measured and paid for by the actual weight in pounds of PAM applied to the wattles. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the *Polyacrylamide(PAM)*.

Payment will be made under:

| <b>Pay Item</b>     | <b>Pay Unit</b> |
|---------------------|-----------------|
| Polyacrylamide(PAM) | Pound           |
| Wattle              | Linear Foot     |

### **BORROW PIT DEWATERING BASIN:**

(3-17-09)

#### **Description**

Water discharge from borrow pit sites shall not cause surface waters to exceed 50 NTUs (nephelometric turbidity unit) in streams not designated as trout waters and 10 NTUs in streams, lakes or reservoirs designated as trout waters. For lakes and reservoirs not designated as trout waters, the turbidity shall not exceed 25 NTUs. If the turbidity exceeds these levels due to natural background conditions, the existing turbidity level shall not be increased.

Construct, maintain, and remove earth embankments used to reduce turbidity from dewatering borrow sites. Work includes providing porous coir fiber baffle, filter fabric, stone, outlet structures, cleaning out, maintaining, removing and disposing of the borrow pit dewatering basin and all components, and reshaping the area, as well as dressing, seeding and mulching the area.

#### **Materials**

Utilize suitable excavated materials, as specified in Sections 225, 230, and 240 of the *Standard Specifications* in the construction of earth embankments for borrow pit dewatering basins, except where otherwise specified.

## **Construction Methods**

Construct borrow pit dewatering basins at locations shown on Reclamation Plans or at areas directed by Engineer.

The volume of the borrow pit dewatering basin will be based on a 2 hour retention time. The pump rate shall not to exceed 1,000 GPM (60,000 GPH). The contractor may desire a greater retention time for managing turbidity; however, work associated with this increased volume will be considered incidental.

The straight line distance between the inlet and outlet must be divided to include a forebay chamber in the upper quarter cell. One (1) porous coir fiber baffle shall be installed across full width of the basin to delineate the forebay chamber. No earthen or rock baffle will be used. Filter fabric shall be installed on interior side slopes and floor of the forebay.

The water pumped from the borrow pit into the dewatering basin shall be obtained from the top of the water column and shall be discharged into the forebay in a non-erodible manner.

The borrow pit dewatering basin outlet shall be a vertical non-perforated riser pipe or flash board riser attached with a watertight connection, to a barrel that carries the water through the embankment.

## **Maintenance and Removal**

Maintain the borrow pit dewatering basin, coir fiber baffle, and remove and dispose of silt accumulations in accordance with section 1630-3 of the *Standard Specifications*. The Contractor may wish to include a drain device for maintenance and removal at his discretion.

Remove the borrow pit dewatering basin once dewatering operations are completed. Dress, seed, and mulch the area after removal of the borrow pit dewatering basin in accordance with Section 1660 of the *Standard Specifications*. The area shall be stabilized with an approved groundcover prior to final acceptance of the site.

## **Measurement and Payment**

Borrow Pit Dewatering Basin quantities will be measured and paid for in cubic yards, in place and computed by the average-end-method for the actual number of cubic yards of basin capacity. The measurements will be the internal measurements of the basin measured up to the top of the outlet structure. Materials used to construct the basin that originates from another payment item (i.e. unclassified excavation, borrow excavation) will not be deducted from the volume of that original pay item. Such price shall be full compensation for the construction, maintenance, providing an outlet structure, baffle, filter fabric, stone, and removal once dewatering operations are completed.

**Pay Item**

Borrow Pit Dewatering Basin

**Pay Unit**

Cubic Yard