

B-4112

**Project Special Provisions
Erosion Control**

Forsyth County

SEEDING AND MULCHING:**(West)**

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.

Shoulder and Median Areas

August 1 - June 1

| | |
|-------|--------------------|
| 20# | Kentucky Bluegrass |
| 75# | Hard Fescue |
| 25# | Rye Grain |
| 500# | Fertilizer |
| 4000# | Limestone |

May 1 - September 1

| | |
|-------|---------------------------|
| 20# | Kentucky Bluegrass |
| 75# | Hard Fescue |
| 10# | German or Browntop Millet |
| 500# | Fertilizer |
| 4000# | Limestone |

Areas Beyond the Mowing Pattern, Waste and Borrow Areas:

August 1 - June 1

| | |
|-------|--------------------|
| 100# | Tall Fescue |
| 15# | Kentucky Bluegrass |
| 30# | Hard Fescue |
| 25# | Rye Grain |
| 500# | Fertilizer |
| 4000# | Limestone |

May 1 - September 1

| | |
|-------|---------------------------|
| 100# | Tall Fescue |
| 15# | Kentucky Bluegrass |
| 30# | Hard Fescue |
| 10# | German or Browntop Millet |
| 500# | Fertilizer |
| 4000# | Limestone |

Approved Tall Fescue Cultivars

| | | | |
|--------------|-----------------|-----------------|--------------------|
| Adventure | Bonanza II | Inferno | Rendition |
| Adventure II | Bulldog 51 | Jaguar | Renegade |
| Airlie | Chapel Hill | Jaguar III | Safari |
| Amigo | Chesapeake | Kentucky 31 | Shelby |
| Anthem | Chieftain | Kitty Hawk | Shenandoah |
| Anthem II | Coronado | Kitty Hawk 2000 | Southern Choice II |
| Apache | Covenant | Monarch | South Paw |
| Apache II | Crossfire II | Montauk | Tempo |
| Arid | Debutante | Mustang | Titan |
| Arid II | Duster | Mustang III | Titan Ltd. |
| Arid III | Escalade | Olympic | Tomahawk |
| Aztec II | Falcon | Pacer | Tacer |
| Barlexas | Falcon III | Paraiso | Trailblazer |
| Barlexas II | Finelawn | Pixie | Tribute |
| Barrera | Finelawn I | Pyramid | Trooper |
| Barrington | Finelawn Petite | Quest | Wolfpack |

| | | | |
|------------|----------|----------|----------|
| Bingo | Genesis | Rebel | Wrangler |
| Bravo | Grande | Rebel Jr | |
| Brookstone | Guardian | Rebel II | |
| Bonanza | Houndog | Red Coat | |

Approved Kentucky Bluegrass Cultivars:

| | | | |
|----------|------------|-----------|-----------|
| Adelphi | Brilliant | Kenblue | Princeton |
| Apollo | Bristol | Liberator | Ram I |
| Bariris | Challenger | Merit | Rugby |
| Baron | Columbia | Nuglade | Sydsport |
| Baronie | Fylking | Odyssey | Touchdown |
| Bartitia | Glade | Plush | Vantage |

Approved Hard Fescue Cultivars:

| | | | |
|---------|----------|---------|---------|
| Aurora | Minotaur | Scaldis | Waldina |
| Bardur | Nordic | Spartan | Warwick |
| Crystal | Reliant | Valda | |

On cut and fill slopes 2:1 or steeper add 20# Sericea Lespedeza January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, 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.

Native Grass Seeding And Mulching

Bluegrass

Native Grass Seeding and Mulching shall be performed on the disturbed areas of wetlands, and adjacent to Stream Relocation and/or trout stream 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.

August 1 - June 1

| | |
|-----|--------------------|
| 25# | Kentucky Bluegrass |
| 8# | Big Bluestem |
| 6# | Indiangrass |
| 4# | Switchgrass |
| 35# | Rye Grain |

May 1 – September 1

| | |
|-----|------------------------------|
| 25# | Kentucky Bluegrass |
| 8# | Big Bluestem |
| 6# | Indiangrass |
| 4# | Switchgrass |
| 25# | German or Browntop Millet |

| | | | |
|-------|------------|-------|------------|
| 500# | Fertilizer | 500# | Fertilizer |
| 4000# | Limestone | 4000# | Limestone |

Approved Kentucky Bluegrass Cultivars:

| | | | |
|----------|------------|-----------|-----------|
| Adelphi | Brilliant | Kenblue | Princeton |
| Apollo | Bristol | Liberator | Ram I |
| Bariris | Challenger | Merit | Rugby |
| Baron | Columbia | Nuglade | Sydsport |
| Baronie | Fylking | Odyssey | Touchdown |
| Bartitia | Glade | Plush | Vantage |

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, 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.

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*.

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. 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 shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. Upon written approval of the Engineer, 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.

SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for *Seeding and Mulching*, and the rate of application 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 six inches.

LAWN TYPE APPEARANCE:

All areas adjacent to lawns must be hand finished as directed to give a lawn type appearance. Remove all trash, debris, and stones $\frac{3}{4}$ " and larger in diameter or other obstructions that could interfere with providing a smooth lawn type appearance. These areas shall be reseeded to match their original vegetative conditions, unless directed otherwise by the Field Operations Engineer.

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 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:

Pay Item

Specialized Hand Mowing

Pay Unit

Hour

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:

| Pay Item | Pay Unit |
|------------------------------|-----------------|
| Response for Erosion Control | Each |

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.

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*.

TEMPORARY EARTH BERMS:**Description**

This work consists of installing, maintaining, and removing any and all material required for the construction of temporary earth berms. The temporary earth berms shall be used to direct the flow of water to specific erosion control device(s), or to direct water flowing from offsite around/away from specific area(s) of construction.

Construction Methods

The Contractor shall install the temporary earth berms in accordance with the details in the plans and at locations indicated in the plans, and as directed. Upon installation, the earth berms shall be immediately stabilized as provided in Section 1620 of the *Standard Specifications*. Other stabilization methods may be utilized with prior approval from the Engineer.

Upon completion of the project, the temporary earth berms shall be removed. The earth material can be utilized in the filling of silt ditches and detention devices, or graded to match the existing contours and permanently seeded and mulched.

Measurement and Payment

The installation of the temporary earth berms will be paid for as *Borrow Excavation* as provided in Section 230 of the *Standard Specifications* or included in the lump sum price for grading.

Stabilization of the temporary earth berms will be paid for as *Temporary Seeding* as provided in Section 1620 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 the temporary earth berms.

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.

Either wood posts or steel posts may be used. Wood posts shall be nominal 2" x 4" or 4" x 4" lengths as required, structural light framing, grade No. 2, Southern Pine. 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 steel post shall be equipped with an anchor plate having a minimum area of 14 square inches.

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:

| Pay Item | Pay Unit |
|-----------------|-----------------|
| 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 100% coconut fiber stitch bonded between a heavy duty UV stabilized cusped (crimped) netting overlaid with a heavy duty UV stabilized top net. The three nettings shall be stitched together on 1.5" centers UV stabilized polyester thread to form a permanent three-dimensional structure. The mat shall have the following physical properties:

| Property | Test Method | Value | Unit |
|---|--------------------|--------------|-------------|
| Ground Cover | Image Analysis | 93 | % |
| Thickness | ASTM D1777 | 0.63 | in |
| Mass Per Unit Area | ASTM D3776 | 0.92 | lb/sy |
| Tensile Strength | ASTM D5035 | 480 | lb/ft |
| Elongation | ASTM D5035 | 49 | % |
| Tensile Strength | ASTM D5035 | 960 | lb/ft |
| Elongation | ASTM D5035 | 31 | % |
| Tensile Strength | ASTM D1682 | 177 | lbs |
| Elongation | ASTM D1682 | 22 | % |
| Resiliency | ASTM D1777 | 80> | % |
| UV Stability * | ASTM D4355 | 151 | lbs |
| Color (Permanent Net) | | UV Black | |
| Porosity (Permanent Net) | Calculated | >95 | % |
| Minimum Filament Diameter (Permanent Net) | Measured | 0.03 | in |

*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure in a Xenon-arc weatherometer.

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:

| Pay Item | Pay Unit |
|----------------------------------|-----------------|
| 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 8-gauge 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. Attach an 8-gauge 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:

Pay Item

Coir Fiber Baffle

Pay Unit

Linear Foot