

**R-0513A/BA**

**Project Special Provisions  
Erosion Control**

**Robeson County**

**Seeding And Mulching:**

(4)

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 by the Engineer. All rates are in pounds per acre (kilograms per hectare).

January 1 - December 31

- 50# (55kg) Tall Fescue
- 5# (6kg) Centipede
- 50# (55kg) Pensacola Bahiagrass
- 500# (560kg) Fertilizer
- 4000# (4500kg) Limestone

Slopes 2:1 and Steeper and Waste and Borrow Locations:

January 1 - December 31

- 75# (85kg) Tall Fescue
- 50# (55kg) Pensacola Bahiagrass
- 500# (560kg) Fertilizer
- 4000# (4500kg) Limestone

Approved Tall Fescue Cultivars:

Adventure	Adventure II	Amigo	Anthem
Apache	Apache II	Arid	Austin
Brookstone	Bonanza	Bonanza II	Chapel Hill
Chesapeake	Chieftain	Coronado	Crossfire II
Debutante	Duster	Falcon	Falcon II
Finelawn Petite	Finelawn	Finelawn I	Genesis
Grande	Guardian	Houndog	Jaguar
Jaguar III	Kentucky 31	Kitty Hawk	Monarch
Montauk	Mustang	Olympic	Pacer
Phoenix	Pixie	Pyramid	Rebel
Rebel Jr.	Rebel II	Renegade	Safari
Shenandoah	Tempo	Titan	Tomahawk
Trailblazer	Tribute	Vegas	Wolfpack
Wrangler			

Add 10# (12kg) Kobe or Korean Lespedeza to the above mixtures May 1 - August 31.

On cut and fill slopes 2:1 or steeper add 30# (35 kg) 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.

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 (2 meters) 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 inches (200 mm).

**Temporary Seeding:**

Fertilizer shall be the same analysis as specified for "Seeding and Mulching" and applied at the rate of 400 pounds (450 kilograms) and seeded at the rate of 50 pounds per acre (55kg per hectare). Kobe or Korean Lespedeza, 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 (560 kg per hectare). 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 10-20-20 analysis.

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 (560 kg per hectare). 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", 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 (28kg to 85kg per hectare). The actual rate per acre (hectare) will be determined by the Engineer prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre (hectare), 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 (100 mm).

**Lawn Type Appearance**

All areas adjacent to lawns must be hand finished as directed by the Engineer to give a "lawn type appearance". Remove all trash, debris, and stones  $\frac{3}{4}$  inch (19 mm) 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 Seeding Under Guiderail and Guardrail (Centipede):****General:**

Areas under guiderail and guardrail sections shall be seeded in accordance with these provisions and as directed by the Engineer. Perform the work covered by this provision including but not limited to litter and debris removal, mowing, disposal of weeds and other unacceptable growth, grading, soil preparation and amendment, surface smoothing, seed and herbicide applications, matting installation and all required materials necessary to complete work.

**Materials:**

Only approved centipede grass seed that complies with Section 1060 of the Standard Specifications shall be used.

**Soil Preparation:**

Remove litter and other debris. Mow and satisfactorily dispose of weeds or other unacceptable growth on the areas to be seeded.

Prior to seeding, all eroded, uneven and rough areas shall be contour graded and/or filled with soil as directed by the Engineer. The soil shall be scarified or otherwise loosened to a depth of not less than 5 inches (130 mm) with a minimum width of 48 inches (1145 mm) and a maximum width of 52 inches (1320 mm). Clods shall be broken and the top 2 to 3 inches (52 to 78 mm) of soil shall be worked into an acceptable soil bed by the use of soil pulverizers, drags, or harrows.

Soil amendments shall be as follows:

Limestone: Limestone shall be applied at a rate of 2000 pounds (2250 Kg/Hectare) per acre.

Fertilizer: Fertilizer shall be 10-20-20 analysis and applied at a rate of 300 pounds (330 Kg/Hectare) per acre.

Application of limestone and fertilizer will be considered incidental to the work of "Specialized Seeding Under Guiderail/Guardrail (Centipede)" and no direct payment will be made for such.

After soil preparation, lime and fertilizer shall be uniformly distributed by mechanical means using a 48 inch (1065 mm) drop type spreader (or other approved equipment) and thoroughly mixed with the top five inches (130 mm) of the soil by discing, harrowing, or other approved methods.

The area shall then be harrowed, dragged, raked, or prepared by other approved methods which will give a lawn type finish. All trash, debris and stones larger than 1-1/2 inch (38 mm) in diameter or other obstructions shall also be removed.

Application:

Centipede seed shall be uniformly distributed at a rate of 20 pounds per acre (28 kilograms per hectare) by mechanical means.

Immediately following the placement of seed, the area shall be cultipacked carefully and firmly by means acceptable to the Engineer to ensure a smooth surface.

Herbicidal Treatment Under Guiderail and Guardrail:

Upon completion of seeding and rolling or tamping operations, a herbicidal treatment shall be made in accordance with these specifications. Herbicide applications will be made by or under the direct supervision of a licensed North Carolina Department of Agriculture and Consumer Services applicator. No direct payment will be made for additional herbicidal work if such work is due to carelessness or neglect on the part of the contractor.

Apply herbicide evenly over the soil surface with the properly calibrated equipment at the specified rate. Sprayers shall be equipped to provide continuous agitation of the spray

mixture during application to ensure application of a uniform spray solution. The herbicide sprayer shall provide a uniform, low volume-low pressure application that does not drift nor produce runoff of product which damages vegetation outside of the 48-inch seeding area. The sprayer shall provide a total volume application rate of 10 to 30 gallons per acre.

The following herbicide shall be used:

<u>Product Name</u>	<u>Application Rate</u>
Drexel Atrazine 4L	1 quart per acre

Due to labeling restrictions, no substitutions shall be allowed for this product. Product label shall be provided to the Engineer for approval prior to beginning work.

Matting:

Immediately upon completion of seeding work and herbicidal application, 48 inch wide matting shall be installed over the seeded area in accordance with Section 1631 of the Standard Specifications.

Basis of Payment:

The quantity of "Specialized Seeding Under Guiderail and Guardrail (Centipede)" to be paid for will be the actual number of acres (hectares) of guiderail and guardrail sections, measured along the surface of the ground, over which acceptable seeding has been performed. The quantity of seeding will be paid for at the contract unit price per acre (hectare) for "Specialized Seeding Under Guiderail and Guardrail (Centipede)".

No payment shall be made for "Specialized Seeding Under Guiderail and Guardrail (Centipede)" in which the work has not been satisfactorily completed. Complete work includes but is not limited to soil preparation, surface smoothing, seeding, herbicidal work, and matting.

### **Specialized Hand Mowing:**

The work covered by this section 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.

The work of 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 which occur during the construction of the project. The quantity of mowing may be increased, decreased or eliminated entirely at the direction of the Engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

The quantity of specialized hand mowing to be paid for will be the actual number of man hours worked while hand mowing along the surface of the ground, at the direction of the Engineer. Where an area has been mowed more than once, at the direction of the Engineer, separate measurement will be made each time the area is mowed.

Payment will be made under:

Specialized Hand Mowing.....HR

**High Quality Waters:**

The Lumber River has been identified as high quality waters. 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. This also requires special procedures to be used for seeding and mulching and staged seeding.

**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 “High Quality Water Zone(s)” as indicated on the E.C. Plans.

**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 which are greater than 20 feet (6 meters) in height or greater than 2 acres (0.8 hectares) in area. Each stage shall not exceed the limits stated above.

All work described above will be paid for at the contract unit prices established in the contract for the work involved. Additional payments will not be made for the requirements of this section as the cost for this work should be included in the contract unit prices for the work involved.

### Environmentally Sensitive Areas:

#### Clearing and Grubbing:

In areas identified on the erosion control plans as “Environmentally Sensitive Areas”, the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Section 200, Article 200-1, in the Standard Specifications. The “Environmentally Sensitive Area” shall be defined as a 50 foot (16 meter) buffer zone on both sides of the stream, measured from top of streambank. 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.

#### Grading:

Once grading operations begin in identified “Environmentally Sensitive Area”, work will progress in a continuous manner until complete. All construction within these areas must progress in a continuous manner such that each phase is complete and areas 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” as specified will be just cause for the Engineer to direct the suspension of work in accordance with Section 108-7 of the Standard Specifications.

#### Temporary Stream Crossings:

Any crossing of streams within the limits of this project must be accomplished in accordance with Section 107-13(b) of the Standard Specifications.

### **Minimize Removal Of Vegetation**

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

### **Stockpile Areas**

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

**Reforestation:**

Reforestation will be planted within interchanges and along the outside borders of the road, in areas designated by the Engineer. Reforestation is not shown on the plan sheets. See the reforestation detail sheet.

Seasonal limitations: Seedlings shall be planted from November 15 through March 15.

Seedlings shall be planted as soon as practical following permanent Seeding and Mulching. Seedlings shall be planted in a 16 ft. (5 meters) wide swath adjacent to mowing pattern line.

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.

**Waste Areas 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 which may be required on a commercial borrow or waste site will be done at the Contractor's expense.

**Temporary Diversion:**

The work by this section for installation, maintenance, and cleanout of temporary diversions shall be in accordance with Section 1630. The quantity of excavation for installation and cleanout measured as provided in Article 1630-4 will be paid for at the contract unit price per cubic yard (cubic meter) as provided in Article 1630-5 for "Silt Excavation".



**Safety Fence:**

## Description:

The work of "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, and as directed by the Engineer in accordance with the special provisions included herein. The fence shall be installed prior to any land disturbing activities.

## Materials:

## Fence Material:

Polyethylene or polypropylene fence shall be a preconstructed safety fence approved by the Engineer.

## Posts:

Either wood posts or steel posts may be used. Wood posts shall be nominal 2" x 4" (51 mm x 102 mm) or 4" x 4" (102 mm x 102 mm), lengths as required, structural light framing, grade No. 2, Southern Pine. Steel posts shall be at least 5 feet (1.6 m) in length, approximately 1 3/8" (35 mm) wide measured parallel to the fence, and have a minimum weight of 1.25 lb./ft. (1.9 kg/m) of length. The steel post shall be equipped with an anchor plate having a minimum area of 14 square inches (90 square centimeters).

## Clearing and Grading:

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 by the Engineer, minor grading along the fence line shall be done to meet this requirement provided no obstructions to proper drainage are created.

## Installation:

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. If power driven, wood posts may be sharpened to a dull point. 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" (51 mm) 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.

Method of Measurement:

The quantity of safety fence to be paid for shall be the actual number of linear feet (meter) of "Safety Fence", installed in place and accepted. No direct payment will be made for post and post bracing. Cost shall be included in the cost of the fence per linear foot (meter).

Basis of Payment:

The quantity of safety fence measured as provided above will be paid for at the contract unit price per linear foot (meter) of safety fence. Such payment will be full compensation for the work as described in the above paragraphs, 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 the work.

Payment will be made under:

Safety Fence.....LF (M)

**Gravel Construction Entrance:**

Description:

The work covered by this section consists of furnishing, installing, and maintaining and removing any and all material required for the construction of a Gravel Construction Entrance.

Materials:

The filter fabric shall meet the requirements of Section 1056 for Type 2 Fabric.

Stone shall be Class A Stone and shall meet the requirements of Section 1042 for Stone for Erosion Control, Class A.

Construction:

The Contractor shall install a Gravel Construction Entrance in accordance with the details in the plans and at locations as directed by the Engineer.

**Method Of Measurement:**

Gravel Construction Entrance will not be measured for payment under this section.

**Basis Of Payment:**

Payment for installation of Filter Fabric shall be paid for at the contract unit price per square yard (square meter) "Filter Fabric for Drainage".

Payment for installation of Class A Stone shall be paid for at the contract unit price per ton (metric ton) "Stone for Erosion Control, Class A".

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

**Culvert Diversion Channel:****Description:**

Provide a culvert diversion channel to detour existing stream around the culvert construction site at locations shown on the plans. Work includes constructing diversion channel, disposing of excess materials, providing and placing filter fabric liner, maintaining diversion area in an acceptable condition, removing filter fabric liner, backfilling diversion channel area with suitable material and providing proper drainage when diversion channel area is abandoned.

**Material:**

Use local material or material specified on plans.

Provide filter fabric to meet requirements of Section 1056 for Type 2 fabric.

**Construction requirements:**

Grade channel according to plan with channel surface free of obstructions, debris, and pockets of low density material.

Utilize suitable material and provide disposal area for unsuitable material.

Line channel with fabric unrolled in the direction of flow and lay smoothly but loosely on soil surface without creases. Bury top of slope fabric edge in a trench at least five inches (125mm) deep and tamp.

Make vertical overlaps a minimum of eighteen inches (450mm) with upstream fabric overlapping the downstream fabric.

Secure fabric with eleven gauge (3.05mm) wire staples shaped into a "u" shape with a length of not less than six inches (150mm) and a throat not less than one inch (25mm) in width. Place staples along outer edges and throughout the fabric a maximum of three feet (one meter) horizontally and vertically.

Method of Measurement:

Measurement of excavation will be made by the cubic yard (cubic meter) of excavation as calculated from the typical section throughout the length of the diversion channel as shown on the final approved plans.

Measurement of filter fabric will be made by the number of square yards (square meters) as measured over the surface of the ground over which filter fabric has been acceptably placed.

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

Basis of Payment:

Payment will be made for the quantities as measured above under the items listed below:

Culvert Diversion Channel .....CY (M3)

Filter Fabric for Drainage ..... SY (M2)

**Impervious Dike:**

The work covered by this section consists of furnishing, installing, maintaining, and removing an impervious dike for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed by the Engineer.

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious fabric.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

The quantity of impervious dike to be paid for will be the actual number of linear feet (meters) of impervious dike(s) constructed, measured in place from end to end of each separate installation which has been completed and accepted.

The quantity of impervious dikes measured as provided above will be paid for at the contract unit price per linear foot (meter) for "Impervious Dike".

The above prices and payments will be full compensation for all work covered by this section including but not limited to furnishing all of the materials in the impervious dike, construction, maintenance, and removal of the impervious dike.

### **Temporary Pipe For Culvert Construction:**

The work covered by this section consists of furnishing, installing, maintaining and removing any and all temporary pipe used on this project in conjunction with the culvert construction. The Contractor shall install temporary pipe in locations shown on the plans in such a manner approved by the Engineer. The temporary pipe shall provide a passage-way for the stream through the work-site. The minimum size requirements will be as stated on the Erosion and Sediment Control plans.

The quantity of temporary pipe to be paid for will be the actual number of linear feet (meters) of temporary pipe approved by the Engineer and measured in place from end to end.

The quantity of temporary pipe measured as provided above will be paid for at the contract unit price per linear foot (meter) for "\_\_\_ inch (mm) Temporary Pipe".

The above prices and payments will be full compensation for all work covered by this section including but not limited to furnishing all materials required for installation, construction, maintenance, and removal of temporary pipe.

### **Special Sediment Control Fence:**

#### **Description:**

The work covered by this section 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 by the Engineer.

#### **Materials:**

##### **(A) Posts:**

Either wood or steel posts may be used. Wood posts shall be a minimum of 6 feet long (1.8 m), at least 3 inches (75 mm) in diameter, and straight enough to provide a fence

without noticeable misalignment. Steel posts shall be at least 5 feet (1.5 m) in length, approximately 1 3/8 inches (35 mm) wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft (1.86 kg/m) of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches (9000 square millimeters), and shall have a means of retaining wire in the desired position without displacement.

(B) 1/4 inch (6.4mm) Hardware Cloth:

Hardware cloth shall have 1/4 inch (6.4mm) openings constructed from #24 gauge wire. Install hardware cloth according to the detail shown on the plans.

C) Sediment Control Stone:

Sediment control stone shall meet the requirements of Section 1005. Install stone according to the detail shown on the plans.

Maintenance and Removal:

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 by the Engineer in accordance with Section 1630.

Method of Measurement:

The quantity of 1/4 inch (6.4mm) hardware cloth to be paid for will be the actual number of linear feet (meters) measured along the ground, which has been completed and accepted.

The quantity of sediment control stone will be measured according to Article 1610-4.

Basis of Payment:

Payment for special sediment control fence will be as follows:

1/4 inch (6.4mm) Hardware Cloth.....	LF (M)
Sediment Control Stone .....	TON (MT)

**THIS PAGE INTENTIONALLY LEFT BLANK**