SEEDING

30.1 Scope

This work shall consist of seeding, fertilizing, liming when specified, mulching, and applying nitrogen when specified on all areas shown on the plans or where directed by the Engineer all in accordance with these specifications. The Contractor shall coordinate seeding with the construction of fill and cut slopes. In order to limit the area of erodible material the Engineer may require that partially completed slopes be brought to the required slope and that the Contractor perform seeding operations at that time.

30.2 Materials

30.2.1 Materials, General: The contractor shall, at the time of delivery, furnish the Engineer invoices of all materials received in order that the application rate of materials may be determined.

30.2.2 Seed: All seed shall conform to all State laws and to all requirements and regulations of the South Carolina Department of Agriculture.

The several varieties of seed shall be individually packaged or bagged, and tagged to show name of seed, net weight, origin, germination, lot number, and other information required by the Department of Agriculture.

The City reserves the right to test, reject, or approve all seed before seeding.

Mixtures of different types of seed called for in the seeding schedule shall be weighed and mixed in the proper proportions at the site of the work in the presence of the Engineer.

30.2.3 Seeding Schedule: Unless otherwise provided, the contractor may select the type of seeding from the table shown below as applicable to the time of year planting will occur.

The total pounds of seed per acre shall be the sum total shown for all the varieties of seed opposite the schedule number in the seeding schedules below:

SEEDING SCHEDULE FOR PERMANENT VEGETATION
LOWER STATE

Schedule No.	Common Name of Seed	Rural Rate	Urban* Rate	Planting Dates
3	Common Bermuda (hulled)***	0	60	March 1-Aug. 14
	Pensacola Bahia	50	0	
	Sericea Lespedeza (scarified)	50**	50**	
4	Common Bermuda (unhulled)***	0	90	Aug. 15- Feb. 28
	Pensacola Bahia	50	0	
	Sericea Lespedeza (unhulled, unscarified)	80**	80**	
	Reseeding Crimson Clover****	0	0	
	Annual Ryegrass	5	15	
	Rye Grain	20	0	

* Includes rural areas adjacent to well-developed lawns.

** Not required on shoulders, medians, etc., and slopes under 5 feet in height.

*** Giant Bermuda seed, including NK-37, shall not be used.

**** Reseeding Crimson Clover shall be inoculated in accordance with Subsection 810.05. of the SCDOT Standard Specification, Latest Edition for Highway Construction.

The upper state shall be considered as consisting of all counties west of the counties of Aiken, Lexington, Richland, Kershaw and Chesterfield. The lower state shall consist of the above cited counties and all counties east.

The Contractor may include quantities of ryegrass and millet in Schedules 1 and 3 in order to establish quick ground cover for erosion control purposes.

SEEDING SCHEDULES FOR TEMPORARY VEGETATION
UPPER AND LOWER STATE

Schedule No.	Common Name of Seed	Lbs. per acre Rate	Planting Dates
1	Annual Sudan Grass (Sweet or Tift)	40	April 1- August 15
2	Brown Top Millet	50	April 1- August 15
3	Rye Grain Annual Ryegrass	55 15	August 16- March 31

30.2.4 Commercial Fertilizers: Commercial fertilizers shall comply with State laws.

In a mixed fertilizer such as 10-10-10; the first number shall represent the minimum percent of nitrogen required, the second number shall represent the minimum percent of available phosphoric acid required, and the third number shall represent the minimum percent of water soluble potash required in the fertilizer.

30.2.5 Lime: Lime shall be agricultural grade, ground limestone and shall conform to the current "Rules and Regulations and Standards of the Fertilizer Board of Control".

These rules, regulations and standards are promulgated and issued by the Fertilizer Board of Control at Clemson University in accordance with Section 16 of the South Carolina Liming Materials Act. Each bag shall have affixed in a conspicuous manner a tag or label, or in the case of bulk sales, a delivery slip showing brand or trade name, calcium carbonate equivalent, percent by weight passing prescribed U. S. Standard sieves and other pertinent information to identify lime as being agricultural grade, standard ground limestone.

30.2.6 Emulsified Asphalt SS-1: Emulsified Asphalt SS-1 shall meet the requirements of Subsection 17.2.5.

30.2.7 Emulsified Asphalt RS-2: Emulsified Asphalt RS-2 shall meet the requirements of Subsection 17.2.5. The RS-2 emulsion shall be diluted at the manufacturing plant with an equal amount of water. The resulting material shall be homogenous and satisfactory for sparying.

30.2.8 Straw Mulch: Straw mulch material shall consist of straw or hay. Straw shall be stalks of wheat, rye, barley, oats, or other approved straw. Hay shall consist of timothy, pervine, alfalfa, coastal bermuda, or other grasses from approved sources. These materials shall be dry and shall be reasonably free from mature seed bearing stalks, roots, or bulblets of Johnson Grass, Nutgrass, Sandbur, Wild Garlic, Wild Onion, Wild Mustard, Crotolarida, Pigweed, Witchweed, and Cocklebur. The contractor shall also comply with all State and Federal domestic plant guarantine regulations.

30.2.9 Wood Cellulose Fiber Mulch: Wood cellulose fiber mulch shall be made from wood chip particles manufactured particularly for discharging uniformly on the ground surface when dispersed by a hydraulic water sprayer. It shall remain in uniform suspension in water under agitation and blend with grass seed and fertilizer to form a homogenous slurry. The mulch fibers shall intertwine physically to form a strong moisture-holding mat on the ground surface and allow rainfall to percolate the underlying soil. The mulch shall be heat processed so as to contain no germination or growth-inhibiting factors. It shall be dyed (non-toxic) an appropriate color to facilitate metering of material.

Suppliers shall be prepared to certify that laboratory and field testing of their product has been accomplished, and that it meets all of foregoing requirements based upon such testing.

Weight specifications of this material from suppliers and for all applications shall refer only to air dry weight of the fiber material. Absolute air dry weight is based on the normal weight standard of the Technical Association of the Pulp and Paper Industry for wood cellulose and is considered equivalent to 10% moisture. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content.

30.3 Construction Requirements

30.3.1 Stand of Grass: Before acceptance of the seeding performed for the establishment of permanent vegetation, the contractor will be required to produce a satisfactory stand of perennial grass whose root system shall be developed sufficiently to survive dry periods and the winter weather and be capable of restablishment in the spring. The Engineer shall determine the time frame required for said establishment.

Before acceptance of the seeding performed for the establishment of temporary vegetation, the contractor will be required to produce a stand of grass sufficient to control erosion for a given area and length of time before the next phase of construction or the establishment of permanent vegetation is to commence.

30.3.2 Seeding Dates and Rates of Application: Seeding shall be performed during the periods and at the rates, specified in the seeding schedules. Seeding work may, at the discretion of the contractor, be performed throughout the year using the schedule prescribed for the given period. Seeding work shall not be conducted when the ground is frozen or excessively wet. The contractor shall be required to produce a satisfactory stand of grass regardless of the period of the year the work is performed.

30.3.3 Preparation of Ground Before Seeding: The areas to be seeded shall be made smooth and uniform and shall conform with the finished grade and cross section shown on the plans or as otherwise designated. Minor shaping and smoothing of uneven and rough areas outside the graded section shall be performed as directed by the Engineer in order to provide for more effective erosion control and for ease of subsequent mowing operations.

30.3.4 Applying Lime and Fertilizer: Following advance preparation, and placing selected material for shoulders and slopes when called for in the contract, lime and fertilizer shall be spread uniformly over the designated areas and shall be thoroughly mixed with the soil to a depth of approximately two inches. Fertilizer shall be applied at the rate of 500 pounds per acre for the initial application unless otherwise directed. Lime shall be applied at the rate specified in the proposal or as authorized by the Engineer. Unless otherwise provided, lime will not be applied for temporary seeding. In all cases, unless other wise approved by the Engineer, approved mechanical spreaders shall be used for spreading fertilizer and lime. On steep slopes subject to slides and inaccessible to power equipment, the slopes shall be adequately scarified. Fertilizer may be applied on steep slopes by hydraulic methods as a mixture of fertilizer and seed. When fertilizer is applied in combination seed and fertilizer drills, no further incorporation will be necessary. The fertilizer and seed shall be applied together when the method of seeding (Wood Cellulose Fiber Mulch) is used. Any stones larger than 2 1/2 inches in any dimension, larger clods, roots, or other debris brought to the surface shall be removed.

30.3.5 Seeding Unmulched: Seed shall be sown within 24 hours following the application of fertilizer and lime and preparation of the seedbed as specified. Seed shall be uniformly sown at the rate specified by the use of approved mechanical seed drills. Rotary hand seeders, power sprayers or other satisfactory equipment may be used on steep slopes or on other areas that are inaccessible to seed drills.

The seeds shall be covered and lightly compacted by means of a cultipacker or light roller if the drill does not perform this operation. On slopes inaccessible to compaction equipment, the seed shall be covered by dragging spiked chains, by light harrowing or by other satisfactory methods.

Within 24 hours following compaction of the seeded areas, Emulsified asphalt RS-2, diluted at the manufacturing plant with an equal amount of water, shall be uniformly applied over the seeded area at a rate of 0.15 to 0.32 gallon of the dilution per square yard. The exact amount shall be as fixed by the Engineer.

If permitted by the special provisions, wood cellulose fiber mulch used and applied as specified in Subsection 30.3.6 or Method B may be used and the 0.15 to 0.32 gallon of diluted emulsion omitted.

30.3.6 Seeding (Mulched): Seeding (mulched) shall be performed as specified in Method A. Method B will not be permitted except when indicated in the special provisions or as approved by the Engineer.

Method A. Seeding (straw or hay mulch). Seed shall be sown as specified in paragraphs one and two of Subsection 30.3.5. Within 24 hours following covering of the seed, straw or hay mulch material shall be uniformly applied at the rate of 2 tons per acre. Mulch may be spread either by hand, by appropriate mechanical spreaders, or by blowers. The mulch shall allow sunlight to penetrate and air to circulate but also partially shade the ground and conserve soil moisture. The newly laid mulch shall be held in place as specified in (2); (1) shall not be used unless permitted in the special provisions.

(1) Emulsified Asphalt SS-1 shall be injected into the mulch as it leaves the power driven mulch spreader. The amount shall be approximately 150 gallons per ton of mulch material. The exact amount shall be as fixed by the Engineer and the mulch particles without giving a heavy coating of the asphalt material and shall prevent wind erosion. Displaced mulch shall be replaced.

(2) Emulsified Asphalt RS-2 shall be diluted at the manufacturing plant with an equal amount of water and shall be uniformly applied over the mulch material as a film. The film shall be applied at approximately 0.20 gallon of dilution per square yard and shall be sufficient to bond together the mulch particles without giving a heavy coating of the asphalt material and shall prevent wind erosion. Displaced mulch shall be replaced.

Method B. Seeding (Wood Cellulose fiber mulch) - After the lime had been applied and ground prepared as specified in Subsection 30.3.4, wood cellulose fiber shall be applied at the rate of 1,500 pounds per acre in a mixture of seed and fertilizer. Hydraulic equipment shall be used for the application of fertilizer, seed, and slurry of the prepared wood pulp. This equipment shall have a built-in agitation system with an operating capacity sufficient to agitate, suspend, and homogeneously mix a slurry of the specified amount of fiber, fertilizer, seed, and water. The slurry distribution lines shall be large enough to prevent stoppage. The discharge line shall be equipped with a set of hydraulic spray nozzles which will provide even distribution of the slurry on the various areas to be seeded. The slurry tank shall have a minimum capacity of 1,000 gallons.

The seed, fertilizer, wood pulp mulch, and water shall all be combined into the slurry tank for distribution of all ingredients in one operation by the hydraulic seeding method specified herein. The materials shall be combined in a manner recommended by the manufacturer. The slurry mixture shall be so regulated that the amounts and rates of application shall result in a uniform application of all materials at rates not less than the amounts specified. Using the color of the wood pulp as a guide, the equipment operator shall spray the prepared seed-bed with a uniform visible coat. The slurry shall be applied in a sweeping motion, in an arched stream, so as to fall like rain, allowing the wood fibers to build upon each other until an even coat is achieved.

30.3.7 Protection of Structures: Before spraying emulsified asphalt, the contractor shall cover any parts of bridges, culverts, guard rails, signs, sidewalks, curb and gutter, catch basins, pipe ends and other structures as necessary to prevent discoloration.

30.3.8 Application of Nitrogen: As soon as the plants show satisfactory growth, actual nitrogen shall be applied evenly at the rate of 48 pounds per acre on the areas designated by the Engineer. Unless otherwise permitted, the nitrogen shall be applied in a solid form rather than in a liquid state. Nitrogen shall not be applied to stands of Sericea lespedeza. Unless otherwise provided, nitrogen will not be applied to temporary vegetation.

30.3.9 Maintenance: The contractor will be required to do all maintenance necessary to keep seeded areas in a satisfactory condition until the work is finally accepted. This includes mowing and repairing washes, and additional seed, fertilizer and mulch applied to areas where a satisfactory stand of grass has not been achieved.

30.4 Method of Measurement

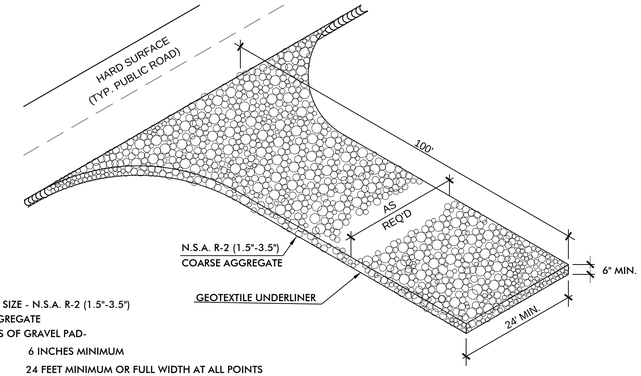
The quantity of Seeding (mulched) to be paid for shall be the actual number of acres of surface area seeded and completed.

30.5 Basis of Payment

The accepted quantities will be paid for at the contract unit price per acre for Seeding (mulched), which price and payment shall be full compensation for furnishing all materials (selected materials for shoulder and slopes), labor, tools, equipment, and incidentals necessary to complete the work herein prescribed in a workmanlike and acceptable manner.

Payment will be made under:

Pay Item	Pay Unit
30A Seeding (mulched)	Acre



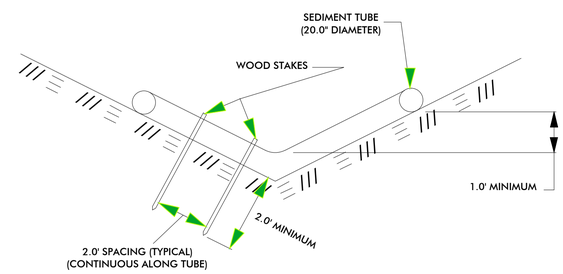
NOTES:

1. AGGREGATE SIZE - N.S.A. R-2 (1.5"-3.5") COARSE AGGREGATE
2. DIMENSIONS OF GRAVEL PAD-
   THICKNESS: 6 INCHES MINIMUM
   WIDTH: 24 FEET MINIMUM OR FULL WIDTH AT ALL POINTS OF THE VEHICULAR ENTRANCE AND EXIT AREA; WHICHEVER IS GREATER.
   LENGTH: 100 FEET
3. LOCATION: LOCATE CONSTRUCTION ENTRANCES AND EXITS TO LIMIT SEDIMENT FROM LEAVING THE SITE AND TO PROVIDE FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES.
4. AVOID STEEP GRADES AND ENTRANCES AT CURVES.
5. LEAVE PAD IN PLACE AT THE END OF CONSTRUCTION.
6. NO SEPERATE PAYMENT WILL BE MADE FOR THIS ITEM. IT SHALL BE CONSIDERED INCIDENTAL TO MOBILIZATION.

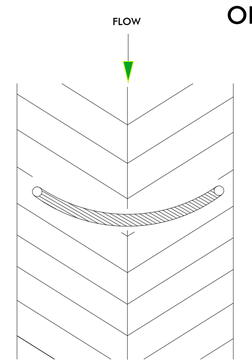
CRUSHED STONE STABILIZED CONSTRUCTION ENTRANCE

N.T.S.

SHOWN AS (CE) ON PLANS



END VIEW OF DITCH



TOP VIEW OF DITCH

NOTES:

1. SEDIMENT TUBE SHALL BE INSTALLED IMMEDIATELY AFTER GRADING UNTILL GRADING IS RESTABLISHED.
2. SEDIMENT TUBE MAY BE TEMPORARILY MOVED DURING CONSTRUCTION AS NEEDED.
3. DIAMETER OF SEDIMENT TUBE SHALL BE 20 INCHES FOR DITCH APPLICATIONS.
4. WHEN SEDIMENT TUBE IS USED IN DITCH APPLICATIONS, IT SHALL BE STAKED DOWN WITH WOOD STAKES EVERY 2 FEET ALONG ITS LENGTH. THE STAKES SHALL BE EMBEDDED A MINIMUM OF 2 FEET INTO THE GROUND.
5. THE STAKES SHALL BE INTERTWINED WITH THE OUTER MESH ONLY AND SHALL BE PLACED ON THE DOWNSTREAM SIDE OF THE TUBE. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR OTHER STAKING DETAILS.
6. WHEN NEEDED FOR ADDITIONAL LENGTH, SEDIMENT TUBES MAY BE TIED TOGETHER WITH PLASTIC TIES.
7. MAINTENANCE OF THE SEDIMENT TUBES SHALL BE INCLUDED IN THE UNIT COST PER FOOT OF SEDIMENT TUBE PLACED.

SEDIMENT TUBE IN DITCH

N.T.S.

AIKEN SOUTH CAROLINA

AIKEN MUNICIPAL AIRPORT
AIKEN, SOUTH CAROLINA

THE LPA GROUP
TRANSPORTATION CONSULTANTS
A Unit of Michael Baker Corporation
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SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION THE LPA GROUP INCORPORATED No. C00448

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 21252 LINDY D. BUSBEE 7-28-11

Designer: KLM/CKM	Checked by: CHM
Technician: CKM	Project Number: 121913

REVISIONS

No.	Description	Date	By

Project Name:
RUNWAY 7
GLIDE SLOPE PROJECT
BID PACKAGE NO. 1

Drawing Name:
EROSION CONTROL
DETAILS NO. 2

FAA A.I.P. Project Number:

Date: AUGUST, 2011	Division: AIRPORTS
Scale: NTS	Sheet Number:
	Drawing Number: EC-2

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