

STABILIZATION SPECIFICATION



SPARTANBURG COUNTY, SOUTH CAROLINA

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SPARTANBURG COUNTY STABILIZATION SPECIFICATION

1.0 STABILIZATION INTRODUCTION

This *Stabilization Specification* is developed to improve the success of stabilization and seeding efforts in Spartanburg County, South Carolina.

1.1 TEMPORARY STABILIZATION

Temporary stabilization may include temporary seeding, temporary erosion control blankets, temporary mulches, and other techniques to prevent erosion until either final stabilization can be achieved or until further construction activities take place to re-disturb the area.

1.1.1 Initiating Temporary Stabilization

- Initiate temporary stabilization by mulch or temporary stabilization by seeding as soon as practicable whenever land disturbing activities have been temporarily ceased, **but in no case more than 14 days** after land disturbing activity in that portion of the Project has temporarily ceased. Where land disturbing activities on a portion of the Project are temporarily ceased, and the land disturbing activities are resumed within 14 days, temporary stabilization measures are not required to be initiated on that portion of the Project.
- Initiate temporary stabilization measures as soon as practicable for areas where initiating temporary stabilization measures within 14 days is infeasible (e.g., where snow cover, frozen ground, or drought conditions preclude stabilization).
- Temporary stabilization **by seeding** is required if the Project will not be worked for a **period greater than 60 days**.
- Do not use temporary stabilization by seeding when the ground is frozen and/or when the 10-day forecasted low temperature remains below 35 degrees Fahrenheit.

1.1.2 Acceptance of Temporary Stabilization

For acceptance of temporary stabilization, temporary stabilization must be sufficient to control erosion for a given area and length of time before the next phase of construction or the establishment of permanent stabilization is to commence. A satisfactory stand of temporary stabilization meeting the requirements of this *Specification* is required regardless of the time of the year the work is performed.

1.2 FINAL STABILIZATION

Final Stabilization is defined where all land-disturbing activities at the construction site have been completed and that all areas not covered by permanent structures are either:

- (1) A uniform (e.g., evenly distributed, without large bare areas) permanent vegetative cover with a **minimum density of 70%** has been established, or
- (2) Equivalent permanent stabilization measures (such as the use of landscaping mulch, riprap, pavement, and gravel) have been implemented to provide effective cover for exposed portions of the construction site not stabilized with permanent vegetation.

Final stabilization must be achieved prior to issuing the Notice of Termination (NOT).

1.2.1 Permanent Seeding

Initiate permanent seeding as soon as practicable whenever land disturbing activities have been permanently ceased, **but in no case more than 14 days** after land disturbing activity in that portion of the construction site has permanently ceased. Initiate permanent seeding measures as soon as practicable for areas where initiating permanent seeding measures within 14 days is infeasible (e.g., where snow cover, frozen ground, or drought

conditions preclude stabilization).

When performing permanent seeding for permanent detention ponds, ensure that the detention pond is cleaned of all deposited sediment and is graded to the required permanent detention basin configuration. Ensure the seedbed for the permanent seeding is established in accordance with this *Specification*. **Protect seeded pond banks with an Erosion Control Blanket.**

1.2.2 Acceptance of Permanent Seeding

For acceptance of permanent seeding, a uniform permanent perennial vegetative cover with a **minimum density of 70%** of each square yard of the seeded area is required. A well-developed root system must be established to sufficiently survive dry periods and winter weather and be capable of reestablishment in the spring.

1.3 Sod

Initiate Sod applications **within 14 days** where land disturbing activities have permanently ceased on the Project. Initiate Sod applications measures as soon as practicable for areas where initiating Sod applications within 14 days is infeasible (e.g., where snow cover, frozen ground, or drought conditions preclude stabilization). **Use Sod on slopes less than 2H:1V.**

1.3.1 Acceptance of Sod

Contingent on establishing a satisfactory stand of perennial grass. Sod application areas are acceptable when all requirements including maintenance are met and a healthy, evenly colored, viable stand of grass is established. A satisfactory stand of grass must have a root system that is enough to survive dry periods and winter weather and is capable of re-establishing in the spring.

2.0 SEED

2.1 SEED SCHEDULE

Select a seeding plan utilizing the seeding schedules included in Appendix A or B for all temporary cover by seeding and permanent seeding applications.

2.2 SIMPLIFIED SEEDING SCHEDULE

The exact Simplified Seeding Schedule listed in Appendix A may be used for the specific seeding application/location and applicable planting dates. Non-Slope Areas are defined as areas flatter than a 4H:1V or areas with a grade less than 25%.

It is preferred to specify the Upper State pre-blended permanent seed mixtures included on the most recent edition of the *SCDOT Qualified Products List 88*.

2.3. DETAILED SEEDING SCHEDULE

The Detailed Seeding Schedule as listed in Appendix B may be used for the specific seeding application/location and applicable planting dates.

2.3.1 Non-Slope Areas (areas flatter than a 4H:1V / areas with a grade less than 25%)

- Specify **minimum of 2 perennial seed types** for permanent seeding for Non-Slope Areas.
- Minimum of **1 of the seed types** must be a **turf-type species**.
- When specifying 2 perennial seed types, specify the primary turf type species at the recommended rate shown and the additional perennial seed may be specified at a rate less than the recommended rate shown.

- Specify a minimum of 1 acceptable annual nurse crop species, or a mix of 2 or more annual nurse crops species with one species specified at a minimum Nurse Crop rate of approximately 75% of the recommended rate shown and the other species specified at a Nurse Crop rate that does not exceed approximately 50% of the recommended rate shown.
- **Do not overapply nurse crop species as this can negatively impact permanent seed germination.**
- Specify a minimum of 1 annual seed type for all temporary cover by seeding for Non-Slope Areas based on the specific application and the availability of the seed. Specify the annual seed type at the Temporary Cover rate.

2.3.2 Slopes

- Specify a **minimum of 3 perennial seed types** for permanent seeding for Slope Areas.
- Minimum of one **1 of the seed types** must be a **turf-type species**.
- When utilizing 3 perennial seed types, specify the primary turf type species at the recommended rate shown and specify the additional perennial seeds at a rate less than the recommended rate shown.
- Specify a minimum of 1 acceptable annual nurse crop species, or a mix of 2 or more annual nurse crops species with one species specified at a minimum rate of approximately 75% of the recommended rate shown and the other species specified at a rate that does not exceed approximately 50% of the recommended rate shown.
- **Do not overapply nurse crop species as this can negatively impact permanent seed germination.**
- Specify **minimum of 2 annual seed types** for temporary cover by seeding for Slope Areas based on the specific application and the availability of the seed. Specify the annual seed types at the Temporary Cover rate.

2.4 SEED

Use seed individually packaged or bagged and tagged. Tag must clearly state:

- | | |
|---|------------------------|
| • Net weight | • Botanical name |
| • Common name | • Variety |
| • Grower name | • Grower lot number |
| • Percent purity | • Percent germination |
| • Percent other crop seed | • Percent inert matter |
| • Percent weed seed (if present, provide list of species by botanical name) | • Origin |
- **When mixtures of different types of seed are called for in the seeding schedule, pre-blended mixtures that are individually packaged or bagged and tagged with the tag specifying the botanical and common name of each species contained in the blend, and the percentages of each species are preferred.**
 - When pre-blended seed mixtures are not used, each species is weighed and mixed in the proper proportions on-site in the presence of the *Engineer* to verify the application.
 - When purchasing seed, it is important to observe the expiration date to avoid buying more than can be used before seed expiration.

3.0 SOIL ANALYSIS

A soil analysis is required prior to all permanent seeding applications. A soil analysis is required on all representative soil types for the specified vegetation species prior to agricultural granular lime, granular slow release fertilizer, and soil amendment applications. The *Engineer* determines where distinguishable representative soil types are located on the project site. Representative soil types include existing predominate soils on the project site, cut slopes, fill material, and areas of exposed subsoil.

- Collect 1 soil sample for each distinguishable representative soil type.
- 1 sample consists of mixing 10 sub-samples taken uniformly over each distinguishable representative soil type.
- Take each sub-sample within the top 4 to 6 inches of the soil surface.
- Take soil samples from stockpiles where the material will be the top 6 inches of the seedbed.
- Submit a separate soil sample for each representative soil type to a certified soil testing laboratory.
- At a minimum, the required soil test shall include: percent soil organic matter determined from the Loss-on-Ignition (LOI) method, pH, buffer pH, extractable phosphorus, potassium, lime requirements and recommendations, calculations for CEC (cation exchange capacity), and fertilizer requirements and recommendations.

4.0 SEEDING AMENDMENTS

4.1 LIME

4.1.1 Agricultural Granular Lime

- Use solid agricultural granular lime for all permanent seeding applications and Sodding applications.
- Ensure each bag has 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.

4.1.2 Applying Granular Lime

A soil analysis is required prior to agricultural granular lime applications to determine the need and rate of lime the application for a given area.

Following advance seedbed preparation, uniformly spread solid agricultural granular lime over the designated areas with mechanical spreaders or by hydraulic methods as a mixture of lime and seed. Thoroughly mix agricultural granular lime with the soil to a depth of approximately two 2 inches. Mixing is not required when spreading lime with hydraulic methods.

Apply all agricultural granular lime at a rate that is within $\pm 10\%$ of the weight recommendation of the soil analysis.

- When mixing in the soil a depth of 2 inches, do not apply more than 4,000 lbs/acre in a single application.
- When surface applying, do not apply more than 2,000 lbs/acre in a single application

Agricultural granular lime is not required for temporary seeding applications unless a soil analysis is requested by the *Engineer* or regulatory agency and indicates a pH below 5.0.

4.1.3 Fast Acting Lime

- Use fast acting liquid forms and/or dry forms of lime for all temporary seeding and permanent seeding applications.
- Use fast acting liquid forms and/or dry forms of lime that meet the requirements of agricultural grade granular lime specified herein, except percent by weight passing U.S. Standard Sieves.

4.1.4 Applying Fast Acting Lime

- Apply fast acting liquid lime at a rate of 5 gallons per acre or per the manufacturer's recommendations.
- Apply fast acting dry lime at a rate of 100 pounds per acre or per the manufacturer's recommendations. Fast acting lime may be applied by mechanical spreaders or by hydraulic methods as a mixture with the seed.

4.2 FERTILIZER

4.2.1 Granular Fertilizer

- **A soil analysis must be performed to determine fertilizer application rates.**
- Use slow release granular fertilizer for all permanent seeding applications and all Sodding applications. **Use fertilizer that incorporates a minimum of 50% water insoluble (slow release) nitrogen.** The statements water insoluble, slowly available or slowly available soluble nitrogen also indicate slow release forms of nitrogen.
- **Animal by-product or municipal waste fertilizers are not acceptable under this Specification.**
- In no case should a 20-20-20 fertilizer be used due to the potential burning of the seedbed.

4.2.2 Applying Granular Fertilizer

- Apply fertilizer with mechanical spreaders or by hydraulic methods as a mixture of fertilizer and seed.
- When fertilizer is applied with combination seed and fertilizer drills, no further incorporation is necessary.
- Apply the fertilizer and seed together when hydraulic methods of seeding are used.
- Apply all fertilizer at a rate that is within **±10%** of the weight recommendation of the soil analysis.
- Apply fertilizer that is within **±2** percentage points of the recommendation of the soil analysis.

4.3 BIOLOGICAL GROWTH STIMULANTS

- Provide biological growth stimulants for all temporary seeding, permanent seeding, and Sodding applications.
- **Animal by-products or municipal waste products are not acceptable biological growth stimulants under this Specification. Liquid fertilizers are not acceptable as biological growth stimulants under this Specification.**
- Furnish biological growth stimulants where all components are pre-packaged by the manufacturer to assure material performance and compliance with the minimum requirements.
- Use biological growth stimulants from a manufacturer listed on the most recent edition of the *SCDOT Qualified Product List 74*.

4.3.1 Applying Biological Growth Stimulants

- Strictly follow the manufacturer's recommendations to avoid damage or burning of the seedbed.
- Use approved hydraulic methods to apply biological growth stimulants.
- **Liquid fertilizer is not a biological growth stimulant and can cause burning of the seedbed if applied as such.**

4.4 SOIL AMENDMENTS

Use soil amendments if site soils are determined to be deficient based on the results of the soil analysis. Specifically, use a soil amendment in the following scenarios:

- **Organic matter test results are less than 3.0%.**
- Soil is excessively nutrient deficient to the extent of requiring costly fertilizer additions.
- Soil has excessively low pH values (lower than 5.0) to the extent of requiring costly lime additions.
- pH adjustment requires an addition of lime greater than 6,000 lbs/ac.
- When directed by the Engineer because of known or anticipated difficulty establishing vegetation.

There are three categories of soil amendments: Compost, Hydraulic Biotic Soil Amendments (HBSAs), and Topsoil.

4.4.1 Compost

When using compost as a soil amendment, furnish, place, and mix certified weed free compost to a minimum

depth of 3 inches into the seedbed to ensure a good stand of grass. Refer to Section 5.4 for compost materials.

4.4.2 Hydraulic Biotic Soil Amendment (HBSA)

When using HBSA as a soil amendment, furnish and install HBSA per manufacturer specifications. Refer to *SCDOT Supplemental Technical Specification for HBSA (SC-M-815-18)* or *latest revision* for description, materials, and construction requirements. Use HBSAs listed on the most recent edition of the *SCDOT Qualified Products List 98*.

4.4.3 Topsoil

When using topsoil as a soil amendment, furnish, place, and mix the topsoil to a minimum depth of 3 inches into the seedbed. Topsoil consists of a friable material containing grass roots and is comparatively porous, capable of growing grass, and stable in nature. Topsoil may be saved on site during initial grading activities or may be hauled on site as needed.

5.0 EROSION PREVENTION PRACTICES

5.1 MULCH

Mulch is required for all permanent seeding, temporary seeding, and temporary cover applications. Only use Mulch that is certified weed free. Do not use Mulch in areas where concentrated flow is expected. Use Erosion Control Blankets (ECB) or Turf Reinforcement Matting (TRM) in these situations.

Use Mulch for temporary seeding and temporary cover applications when the application area will require additional grading prior to permanent seeding. Do not use Erosion Control Blankets (ECB) or Turf Reinforcement Matting (TRM) in these situations. Apply Mulch according to Table 1.

TABLE 1: MULCH APPLICATIONS

Mulch ⁴	Applicable Slopes (H:V) ¹	Minimum Application Rate (lbs/acre -dry) ²	50 Pound Bags Per Acre
Wood Chip	≤ 3:1	500 CY/acre	--
Straw or Hay with Tackifier	≤ 4:1	2,000	--
HECP Type 1	≤ 4:1	2,000	40
HECP Type 2	4:1 < S ≤ 3:1	2,500	50
HECP Type 3	3:1 < S ≤ 2:1	3,000	60
HECP Type 4	2:1 < S ≤ 1:1	3,500	70
	>1:1	4,000 (temp cover only) ³	80
Compost Mulch	≤ 2:1	200 CY/acre	--

- 1 The maximum allowable continuous slope length for all mulch applications is 50 feet. Slope interruption devices or TRMs are required for continuous slope length longer than 50 feet.
- 2 Strictly comply with the manufacturer's mixing recommendations for the actual slope steepness and the actual continuous slope length of the application.
- 3 HECP Type 4 may be used for permanent cover applications on slopes 1:1 or greater at a minimum rate of 4,500 pounds per acre only when proper TRM installation is not practicable due to site constraints. **Slope interruption devices are required for continuous slope length longer than 25 feet under these circumstances.**
- 4 When site constraints exceed the acceptable application for Mulch, use Rolled Erosion Control Products (RECPs); Erosion Control Blankets (ECB) or Turf Reinforce Matting (TRM) as appropriate.

5.2 WOOD CHIPS

Wood chip mulch is not applicable for seeding applications. Wood chips or shredded woody materials generated during the clearing stage when trees are shredded using large tub grinders is an acceptable temporary mulch. Place wood chip mulch on slopes < 3H:1V. Apply wood chips to a minimum depth of 3 to 4 inches using a blower, chop handler, or by hand. Wood chip mulch used for temporary cover by mulch must be removed prior to performing permanent seeding. For temporary cover by mulch, install wood mulch materials with the size distributions listed in Table 2.

TABLE 2 - RECOMMENDED WOOD MULCH SIZE DISTRIBUTION

Chip Size	Description	% Total Volume
Up to ½ inch	Small	30
½ to 1 inch	Medium	50
1 to 4 inches	Large	20

5.3 STRAW OR HAY MULCH WITH TACKIFIER

Use straw or hay mulch material that consists of certified weed free straw or hay. Use straw that consists of stalks of wheat, rye, barley, oats, or other approved straw. Use hay that consists of Timothy, Peavine, Alfalfa, Coastal Bermuda, or other grasses from reputable sources. Use materials that are reasonably dry and reasonably free from mature seed-bearing stalks, roots, or bulblets.

Do not use straw or hay mulch in areas adjacent to sidewalks, guardrails, curbs, curb and gutters, or concrete medians. Do not use straw or hay mulch with tackifiers for permanent seeding or temporary cover applications on slopes steeper than 4H:1V. Anchor straw or hay mulch using one of the following tacking agents:

5.3.1 Organic or Chemical Tackifier

Consist of guar gum, plantago, polysaccharides, polymer synthetic resin, polypectate or other material that will give adhesive properties when sprayed on straw mulches. Applications should be heavier at edges, in valleys, and at crests of banks and other areas where the straw or hay mulch may be moved by wind or water. All other areas must have a uniform application of the tackifier. Apply tackifiers at the manufacturer's recommended rate.

5.3.2 Hydraulic Straw Tackifiers

Apply HECF tackifiers at the manufacturer's recommended rate for straw or hay binding.

5.3.3 Emulsified Asphalt

Dilute Emulsified Asphalt at the manufacturing plant with an equal amount of water and uniformly apply it over the straw mulch material as a film. Apply the film at approximately 0.20 gallon of dilution per square yard to sufficiently bond together the straw mulch and prevent wind erosion without creating a heavy coating of asphalt material.

Emulsified Asphalt is not applicable for use in urban areas or along sidewalks, curb and gutters, bridges, and water bodies.

5.3.4 Applying Straw or Hay Mulch

Uniformly apply straw or hay mulch material at the rate of 2,000 pounds per acre. Straw mulch may be spread either by hand, by mechanical spreaders, or by blowers. Apply straw or hay mulch to allow sunlight penetration, air circulation, partial shading of the ground, and conservation of soil moisture. Secure newly laid straw mulch with an approved tackifier. Replace all straw mulch displaced during the tackifier application process.

5.4 COMPOST MULCH

Provide compost only from a compost producer that participates in the United States Composting Council's (USCC) Seal of Testing Assurance (STA) program. Ensure compost possesses no objectionable odors or substances toxic to plants and does not resemble the raw material from which it was derived.

Compost mulch may include, but is not limited to, the following: Leaf and yard trimmings, food scraps, treated biosolids, manure, agricultural residuals, forest residuals, tree wood, bark, and paper.

Ensure compost does not contain any visible refuse, other physical contaminants, or any substance considered harmful to plant growth. Do not use materials that have been treated with chemical preservatives as compost mulch. **Do not use mixed municipal solid waste compost.**

5.4.1 Applying Compost Mulch

- Avoid very coarse compost with particles larger than 3 inches if the application is seeded.
- Ensure application areas are uniform and conform to the finished grade and cross-section shown on the Plans.
- Slightly roughen (scarify) slopes and remove large clods, rocks, stumps, roots larger than 2 inches in diameter and debris on slopes where vegetation is to be established. Where it is practical, track (compact) perpendicular to contours on the slope using a bulldozer before applying the compost.
- Place no more than a 2-inch depth and no less than a 1-inch depth of compost for areas that will receive seeding, planting, or landscaping as shown on the Plans. Modify compost application rates based on specific site conditions including soil characteristics, severity of slope grade, and slope length.
- Uniformly apply compost using a spreader unit, including bulldozers, side discharge manure spreaders, etc. Alternatively, apply compost using a pneumatic (blower) unit or other unit that propels the product directly at the soil surface, thereby preventing water from moving between the soil-compost interface. Where applicable, apply the compost layer a minimum of 3 feet over the top of the slope.
- On highly unstable soils, use compost in conjunction with appropriate structural measures.
- Incorporate seed directly with the compost when using a pneumatic unit. Apply the seed and compost mixture using a pneumatic blower device equipped with a calibrated seed injection system capable of uniformly and simultaneously applying compost and seed. Ensure the pneumatic blower is properly calibrated to provide the specified amounts of seed from the seeding plan. An alternative seeding application includes blending seed into the compost evenly prior to pneumatic compost application.
- When not incorporating seed directly into compost, perform temporary cover by seeding or permanent seeding using hydraulic methods for seed application utilizing a HECP Type 1 as a tracer at a minimum rate of 1,000 pounds/acre.

5.5 HYDRAULIC EROSION CONTROL PRODUCTS (HECPs)

- Use Hydraulic Erosion Control Product (HECPs) as an allowable mulch for temporary cover by mulch, temporary seeding or permanent seeding applications.
- **Do not use HECPs as a channel liner or for areas receiving concentrated flow.**
- Refer to *SCDOT Supplemental Technical Specification for HECP (SC-M-815-11)* or latest revision for HECP description, materials, and construction requirements.
- Use HECPs listed on the most recent edition of the *SCDOT Qualified Products List 79*.
- Utilize Table 3 to select HECPs.

TABLE 3: HECP APPLICATIONS

HECP Type	Application
Type 1	<ul style="list-style-type: none"> - Slopes $\leq 4:1$ - Required functional longevity of soil protection is 60 days. - Soil is dry and rain is not expected within 48 hours after application. High degree of certainty that heavy rains will not immediately follow application.
Type 2	<ul style="list-style-type: none"> - Slopes $4:1 < S \leq 3:1$ - Required functional longevity of soil protection is 90 days. - Soil is dry and rain is not expected within 48 hours after application. High degree of certainty that heavy rains will not immediately follow application.
Type 3	<ul style="list-style-type: none"> - Slopes $3:1 < S \leq 2:1$ - Required functional longevity of soil protection is 180 days. - Soil is dry and rain is not expected within 24 hours after application. High degree of certainty that heavy rains will not immediately follow application.
Type 4	<ul style="list-style-type: none"> - Slopes $2:1 < S \leq 1:1$ - Required functional longevity of soil protection is 365 days. - As a temporary erosion control blanket alternative for slope applications only. - Environmentally sensitive wetlands and other wildlife areas not compatible with products containing netting. - Site requires immediate erosion protection and there is a risk of impending weather.

5.6 TEMPORARY EROSION CONTROL BLANKET (ECB) AND TURF REINFORCEMENT MATTING (TRM)

Consider ECBs or TRMs for permanent seeding applications with steep slopes or areas where there is a significant erosion problem or potential for erosion. **Use ECB and TRM in areas where concentrated flow is expected.**

Do not use ECB and TRM for temporary seeding applications when the application areas will require additional grading or modifications prior to permanent seeding.

Utilize Table 4 to determine appropriate applications of ECB and TRM.

TABLE 4: ECB and TRM APPLICATIONS

ECB/TRM Type ¹	Slope (H:V) ²	Minimum Slope Length (ft)
Temporary ECB or Type 1 TRM	$\leq 2:1$	5
Type 2 TRM	$\leq 1.5:1$	5
Type 3 TRM	$\leq 1:1$	5

- 1 Strictly comply with the manufacturer's specifications.
- 2 The maximum allowable continuous slope length for ECBs is 50 feet. Slope interruption devices or TRMs are required for continuous slope length longer than 50 feet.

Refer to *SCDOT Supplemental Technical Specification for Rolled Erosion Control Products (RECP) (SC-M-815-9)* or latest revision for ECB and TRM description, materials, and construction requirements. **Use Temporary ECBs listed on the most recent edition of the SCDOT Qualified Products List 55. Use TRMs listed on the most recent edition of the SCDOT Qualified Products List 56.**

5.6.1 Installing ECB and TRM

It is important to refer to the manufacturer's specifications when installing ECB or TRM. Pay close attention to specific product descriptions, materials and installation requirements. In addition, it is recommended that a manufacturer's representative be involved when ECBs or TRMs are installed to aid in the selection process as well as the performance evaluation.

5.7 SLOPE INTERRUPTION DEVICES

The maximum allowable continuous slope length for straw or hay mulch, HECPs, compost and ECB applications is 50 feet. Slope interruption devices or TRM are required for continuous slope length longer than 50 feet.

5.7.1 Slope Interruption Device Materials

Use slope interruption devices for erosion prevention on slopes greater than 50 feet in length for HECF and Temporary Erosion Control Blanket slope applications. **Do not use straw bales, natural pine needles, leaf mulch, and or grass clippings.**

Select materials for slope interruption devices from the most recent edition of SCDOT Qualified Products List 58 under Type F Non-Weighted Inlet Tubes.

5.7.2 Slope Interruption Device Installation

- Install slope interruption devices for HECF applications prior to the HECF installation. Excavate a trench along (parallel) the contour of the slope to a depth 1/3 the tube diameter. Place excavated soil on up-slope side of trench. Place slope interruption device into the trench so it contours to the soil surface, ensuring no gaps exists underneath the tube. Compact the excavated soil against the tube on the up-slope side. Ensure the installation of the slope interruption device does not damage the prepared seedbed.
- Install slope interruption devices for ECB application after ECB installation on top of the ECB. Tube trenching is not required. Ensure the installation of the slope interruption device does not damage the installed ECB.
- Install using wooden stakes with a minimum length of 3 feet with minimum measured dimension of ¾-inch x ¾-inch and maximum measured dimension of 1-inch x 1-inch. Do not use steel posts for this application. Install a stake at each end of each tube and space stakes on maximum 4-foot centers. Drive stakes into the ground perpendicular to the slope to a depth of 2 feet or to the maximum extent practicable.
- Install the stakes through the center of the slope interruption device. Abut adjacent tubes tightly, end to end, without overlapping the ends. Tie the tube ends together using heavy twine or plastic locking ties. Dogleg terminal ends of slope interruption devices up slope to ensure containment and the prevention of channeling of runoff.
- Ensure the areas for post installation are compacted so the posts are properly installed.

6.0 SEEDING CONSTRUCTION REQUIREMENTS

6.1 SEEDING DATES AND RATES OF APPLICATION

Perform seeding work during the periods and at the rates specified in the seeding tables located in Appendix A and B of this *Specification*. **Do not use temporary cover by seeding or permanent seeding for projects when:**

- The ground is frozen and/or when 10-day forecasted low temperature remains below 35 degrees Fahrenheit;
- The ground is excessively wet; or
- The ground is excessively dry (periods of drought) unless watering is specified.

During periods of adverse conditions, use temporary cover by mulch.

6.2 SEEDBED PREPARATION

- Ensure areas receiving permanent seeding are uniform and conform to the finished grade of the Project.
- Perform minor shaping and evening of uneven and rough areas outside of the graded area to provide more effective erosion control and for ease of subsequent mowing operations.
- Loosen the seedbed (including cut slopes) to a minimum depth of 3 inches before soil amendments (compost, HBSA, or topsoil), agricultural lime, fertilizer, mulch, other acceptable soil amendments, or seed is applied.
- **An acceptable method of preparing the seedbed on slopes is vertically tracking the seedbed up and down the slope with proper equipment.**
- Ensure the seedbed is uniform and remove stones larger than 2½ inches in any dimension, large dirt clods, roots, or other debris brought to the surface.
- Use Soil Amendments (compost, HBSA, or topsoil) if good seedbed material is not located on site or results of the soil test show the seedbed is excessively deficient in organic matter (< 3%) or is excessively nutrient deficient to the extent of requiring costly fertilizer additions and or have excessively low pH values (< 5.0).
- **Consider the use of mechanical seed drills to perform permanent seeding on areas where temporary seeding or temporary cover by mulch was previously utilized.**

6.3 TEMPORARY COVER BY MULCH

Use temporary cover by mulch where it is not feasible or practicable to bring an area to final slope and grade. Use temporary cover by mulch on isolated problem areas. Finish the surface so that permanent seeding can be performed without subsequent disturbance by additional grading.

6.4 TEMPORARY SEEDING

Following the preparation of the seedbed according to this *Specification*, uniformly sow temporary seed prior to a rainfall event that compacts the seedbed. Use the seed specified in the seeding tables in Appendix A and B of this *Specification* and as shown on the Plans.

Uniformly sow seed at the rate specified using mechanical seed drills, rotary hand seeders, hydraulic equipment, or any other type of equipment that produces a uniform seed application.

After sowing temporary seed, apply an appropriate mulch as listed in this *Specification* within **3 working days** and/or prior to a rainfall event that compacts the seedbed. On small areas inaccessible to machinery, temporary seed may be covered by hand rakes or other methods satisfactory to the *Engineer*. The *CONTRACTOR* may add granular lime and fertilizer as necessary to enhance growth.

Temporary seeding may be used in isolated problem areas or where it is not feasible or practicable to bring an area to final slope and grade. Finish the surface so that permanent cover can be performed without subsequent disturbance by additional grading.

6.5 PERMANENT SEEDING

- Following the preparation of the seedbed, perform permanent seeding within **3 working days** and/or prior to a rainfall event that compacts the prepared seedbed. If a rain event occurs that compacts or erodes the seedbed prior to performing permanent seeding, the seedbed must be re-prepared prior to conducting permanent seeding.
- Use seed specified in the seeding tables in Appendix A and B of this *Specification* and as shown on the Plans and follow the application procedures of this *Specification*. Uniformly sow seed at the rate specified using mechanical seed drills, rotary hand seeders, hydraulic equipment, or any other type of equipment that produces a uniform seed application.

- After sowing permanent seed, apply an appropriate mulch as listed in this *Specification* **within 3 working days** and/or prior to a rainfall event that compacts the prepared seedbed. On small areas inaccessible to machinery, the seed may be covered by hand rakes or other methods satisfactory to the *Engineer*.
- Add fertilizer lime and soil amendments as required by a soil test.

6.6 PROTECTION OF STRUCTURES

Cover any parts of bridges, culverts, guardrails, signs, sidewalks, curb and gutters, catch basins, pipe ends, and other structures as necessary to prevent discoloration before spraying organic or chemical tackifiers, HECs, or HBSAs.

7.0 Sod

Do not use Sod on slopes steeper than 2H:1V, and if Sod is mowed, do not place on slopes steeper than 3H:1V.

7.1 SOD APPLICATION DATES

Install Warm Season Sod between March 1st and September 1st. Install Cool Season Sod anytime during the year as long as the soil is not frozen.

Lay Sod on the prepared Sod Bed within 24 hours after cutting, except that Sod may be stored in stacks or piles, grass to grass and roots to roots for not more than 5 days. Protect Sod against drying from sun or wind and from freezing if necessary. Place Sod when weather conditions and soil moisture are favorable.

Do not place Sod on:

- Soil that is frozen and/or when the 10-day forecasted low temperature remains below 35 degrees Fahrenheit;
- Soil that is excessively wet;
- Soil that is excessively dry (periods of heat or drought) unless watering is specified;
- Soil that is composed of compacted clay; and
- Soil than has been treated with pesticides.

7.2 SOD BED PREPARATION

- Ensure that the Sod Bed receiving Sod is uniform and conforms to the finished grade of the Project.
- Loosen the Sod Bed to a minimum depth of 3 inches before placing Sod.
- To ensure a good stand of Sod in areas where the existing Sod Bed has little or no topsoil, furnish and place Soil Amendments in the Sod Bed.
- Lay Sod when the Sod Bed is moist. If necessary, moisten dry Sod Beds before sod is laid.

7.3 SOD MATERIAL

Provide Sod consisting of living, well-established growth, with a dense root mat of the predominant grass specified. Provide vigorous, well rooted, healthy turf, free from disease, insect pests, weeds, other grasses, stones, and any other harmful or detrimental materials.

Provide machine stripped Sod with a uniform soil thickness of approximately 1-inch. The minimum acceptable soil thickness is ¾-inch. The measurement for thickness excludes top growth and thatch.

7.4 SOD INSTALLATIONS

Ensure sod applications are not installed until the end of the project or when final stabilization is achieved on adjacent areas of the project that drain or discharge to the Sod application. Do not install Sod at the beginning of the project. Do not place Sod until all work of the project is complete and it is time for final stabilization. Project areas may require temporary stabilization by mulch until it is proper time to place Sod.

- Ensure Sod is moist when laid and placed on moist ground.
- Roll or fold sod before lifting. Handle Sod in a manner that prevents tearing, breaking, drying, or any other damage.
- Carefully place Sod by hand, beginning at the downslope end of the application area and working upwards. Place Sod strips at right angles to the flow of surface water. Tightly butt Sod joints edge to edge with stagger joints in a brick-like pattern of at least 12 inches. Plug large gap openings with Sod and fill joints between strips with fine screened topsoil.
- After laying Sod and filling joints, immediately firmly press Sod into the underlying Sod Bed by tamping or rolling with appropriate equipment to eliminate air pockets and provide an even surface.
- Irrigate the Sod until the soil is wet to a depth of 2- to 3-inches and keep moist until grass takes root.
- Ensure installed Sod is watered, mowed, weeded, repaired, or otherwise maintained by the *CONTRACTOR*, to insure the establishment of a uniform healthy stand of grass until acceptance.
- Watering may be necessary after installation and during periods of intense heat and/or lack of rain (drought).
- Keep soil moist to a depth of 2 to 3 inches until sod is fully rooted.
- Mow Sod to a height of 2- to 3-inches after sod is well-rooted (2-3 weeks). Do not remove more than 1/3 of the shoot in any one mowing.
- Sod turf areas will require yearly applications of fertilizer and lime. Apply lime and fertilizer according to soil tests. Only apply lime and fertilizer after the sod has established a good root system.
- Inspect Sod installations frequently, especially after large storm events, until it has established a permanent cover.

8.0 INSPECTION AND MAINTENANCE

8.1 INSPECTION

Ensure that all seed, Sod, fast acting lime, biological growth stimulants, agricultural granular lime, granular fertilizer, soil amendments, straw and hay mulch, HECs, compost mulch, and ECBs are applied according to this *Specification*. The *CONTRACTOR* must prepare and apply these materials on-site in the presence of the *Engineer*, or a member of the *Engineer* staff. The *Engineer*, or member of the *Engineer* staff must document on-site that these materials are applied according to this *Specification* by completing and signing proper forms.

8.2 MAINTENANCE

Perform all maintenance necessary to keep permanent seeding, temporary seeding, temporary cover by mulch, and Sod areas in a satisfactory condition until the work is finally accepted. This includes mowing, repairing areas of erosion and washes, and applying additional seed, fertilizer, and mulch to areas where a satisfactory stand of grass has not been achieved.

Perform all maintenance including watering, repairing washes, additional sodding, and fertilizing where a satisfactory stand of grass has not been achieved until acceptance.

The *CONTRACTOR* is not in violation for permanent seeding, temporary seeding, temporary cover by mulch, and

Sod areas damaged by insects, animals, or extreme rainfall events. An extreme rainfall event is defined as being a 25-year storm event or greater based on the inches of rain received per time interval (30-min, 1-hr, 3-hr, 6-hr, 24-hr etc.) for the particular location as determined from the current NOAA precipitation tables.

8.3 MOWING

Mowing consists of mowing areas seeded or Sodded as necessary to provide adequate sight areas and to maintain the Project in a satisfactory manner.

- Mow when vegetation reaches a height of approximately 18 to 24 inches.
- Do not perform excessive mowing of Slopes resulting in ruts, furrows or grooves or inhibits the establishment of the slope vegetation.
- Ensure mowing results in uniform vegetation height of 4 to 6 inches, unless otherwise directed by the *Engineer*.
- When utilizing a nurse crop for permanent seeding, mow Millet (*no lower than 3 inches*) once it reaches a height of 18 inches to reduce competitiveness with permanent vegetation. Mow Wheat and Rye Grain (*no lower than 3 inches*) once they reach a height of 6-8 inches to reduce competitiveness with permanent vegetation.
- Mow as closely as possible to all fixed objects exercising care not to damage trees, plants, shrubs, signs, delineators, or other appurtenances which are a part of the facility. Hand trimming around such objects may be required.
- Remove litter and debris prior to beginning mowing operations. Immediately remove and properly dispose of all litter and debris resulting from mowing operations. Mowed grass is not normally removed unless it becomes a hazard as determined by the *Engineer*.
- Do not perform mowing when soil and weather conditions are such that rutting or other damage to the Project may occur

8.4 DELIVERY, STORAGE, AND HANDLING

Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging, and location of packaging. Damaged packages are not acceptable.

Deliver lime, fast acting lime, fertilizer, and biological growth stimulants in sealed factory labeled waterproof bags showing weight, chemical analysis, and name of manufacturer. Damaged bags or containers are not acceptable. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures, and construction operations.

Deliver Sod on pallets. Install Sod within 24 hours after cutting, except that Sod may be stored in stacks or piles, grass to grass and roots to roots for not more than 5 days. Protect stored Sod against drying from sun or wind and from freezing if necessary.

APPENDIX A

SIMPLIFIED SEEDING TABLES

Non Slope Areas

Spring / Summer Non Slope Areas (during establishment, mow when Millet reaches 18-inches in height)

Common Name ⁴	Botanical Name	Planting Rate (lbs/acre)	Planting Rate (lbs/1000sqft)	Planting Dates												Characteristics	
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Common Bermudagrass ¹ (hulled = hull absent)	<i>Cynodon dactylon</i>	50	1.15			•	•	•	•	•							Long-lived, warm season perennial, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement.
White Clover	<i>Trifolium repens</i>	5	0.11			•	•										Grows to 1 foot tall. Full sun, low drought tolerance. Good erosion control cover.
Browntop Millet	<i>Panicum ramosum</i>	10	0.23					•	•	•	•	•					Bunch type grain, grows 2-5 feet tall. Full sun, moderate drought tolerance, high salt tolerance.

Fall / Winter Non Slope Areas (during establishment, mow when Rye reaches 6 to 8-inches in height)

Common Name ⁴	Botanical Name	Planting Rate (lbs/acre)	Planting Rate (lbs/1000sqft)	Planting Dates												Characteristics	
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Tall Fescue (KY-31)	<i>Festuca arundinacea</i>	75	1.72	•	•	•	•										Bunch-type grass, grows 2-4 feet tall. Full sun to part shade. Good heat and drought tolerance as well as shade tolerance. Tolerant to marginal, acidic, and poorly drained soils and in areas of low fertility.
Common Bermudagrass ¹ (unhulled = hull present)	<i>Cynodon dactylon</i>	15	0.34	•	•	•	•					•	•	•	•	•	Long-lived, warm season perennial, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement.
White Clover	<i>Trifolium repens</i>	5	0.11			•	•										Grows to 1 foot tall. Full sun, low drought tolerance, low salt tolerance. Good erosion control cover.
Crimson Clover ²	<i>Trifolium incarnatum</i>	20	0.46	•	•	•	•										Upright winter legume, grows from 1-3 feet tall. Full sun, low drought tolerance, no salt tolerance.
Rye Grain ³	<i>Secale cereale</i>	15	0.34	•	•	•	•										Bunch type grain, grows 2-5 feet tall. Full sun, moderate drought tolerance, high salt tolerance.

¹ Common Bermudagrass: Do not use Giant Bermudagrass(NK-37).

² Only use pre-inoculated legumes or use an appropriate inoculant with the seed at planting.

³ Mow Rye Grain (no lower than 3 inches) once it reaches a height of 6-8 inches to reduce competitiveness with permanent vegetation.

⁴ If the Common Name of the seed listed in the Tables is not available, use seed with the listed Botanical Name.

Slopes & Buffers

Spring / Summer Slopes (during establishment, mow when Millet reaches 18-inches in height. After establishment, only mow at end of winter season)

Pick 1	Common Name ⁴	Botanical Name	Planting Rate (lbs/acre)	Planting Rate (lbs/1000sf)	Planting Dates												Characteristics	
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
	Tall Fescue (KY-31)	<i>Festuca aruinacea</i>	50	1.15		•												Bunch-type grass, grows 2-4 feet tall. Full sun to part shade. Good heat and drought tolerance as well as shade tolerance. Tolerant to marginal, acidic, and poorly drained soils and in areas of low fertility.
	Bahiagrass	<i>Paspalum notatum</i>	30	0.69		•	•	•	•	•	•	•	•	•	•	•	•	Warm season perennial, spreads by rhizomes, grows 1-2 feet tall, deep root system. Shade tolerant, salt tolerant, drought tolerant. Low maintenance, tough grass surviving conditions that destroy most turf grasses. Adapts to most soil conditions and extremely tolerant to wear and traffic.
	Common Bermudagrass ¹ (hulled = hull absent)	<i>Cynodon dactylon</i>	25	0.57		•	•	•	•	•	•	•	•	•	•	•	•	Long-lived, warm season perennial, grows 4-6 inches tall. High heat tolerance, high nitrogen requirement.
	White Clover	<i>Trifolium repens</i>	5	0.11		•	•	•	•	•	•	•	•	•	•	•	•	Warm season bunch grass, deep root system, grows 3-6 feet tall. Full sun, high drought tolerance.
	Weeping Lovegrass	<i>Erograstis curvula</i>	10	0.23		•	•	•	•	•	•	•	•	•	•	•	•	Warm season bunch grass, grows 3 feet tall. Full sun, high drought tolerance. Plant at 10%-20% of mix
	Hairy Vetch ²	<i>Vicia villosa</i>	10	0.23		•												Cool season biennial or annual legume. Viney, trailing or climbing growth. Wide range of soil types, best adapted to loamy and sandy soils.
	Browntop Millet	<i>Panicum ramosum</i>	10	0.23		•	•	•	•	•	•	•	•	•	•	•	•	Bunch type grain, grows 2-5 feet tall. Full sun, moderate drought tolerance.

Fall / Winter Slopes (during establishment, mow when Rye reaches 6 to 8-inches in height. After establishment, only mow at end of winter season)

Pick 1	Common Name ⁴	Botanical Name	Planting Rate (lbs/acre)	Planting Rate (lbs/1000sf)	Planting Dates												Characteristics	
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
	Tall Fescue (KY-31)	<i>Festuca aruinacea</i>	50	1.15	•	•	•	•	•	•	•	•	•	•	•	•	•	Bunch-type grass, grows 2-4 feet tall. Full sun to part shade. Good heat and drought tolerance as well as shade tolerance. Tolerant to marginal, acidic, and poorly drained soils and in areas of low fertility.
	Common Bermudagrass ¹ (unhulled = hull present)	<i>Cynodon dactylon</i>	15	0.34	•	•	•	•	•	•	•	•	•	•	•	•	•	Long-lived, warm season perennial, grows 4-6 inches tall. High heat tolerance, high nitrogen requirement.
	White Clover ²	<i>Trifolium repens</i>	5	0.11		•	•	•	•	•	•	•	•	•	•	•	•	Grows to 1 foot tall. Full sun, low drought tolerance, low salt tolerance. Good erosion control cover.
	Weeping Lovegrass	<i>Erograstis curvula</i>	10	0.23		•	•	•	•	•	•	•	•	•	•	•	•	Warm season bunch grass, grows 3 feet tall. Full sun, high drought tolerance.
	Crimson Clover ²	<i>Trifolium incarnatum</i>	20	0.46	•	•	•	•	•	•	•	•	•	•	•	•	•	Upright winter legume, grows from 1-3 feet tall. Full sun, low drought tolerance, no salt tolerance.
	Hairy Vetch ²	<i>Vicia villosa</i>	10	0.23	•	•	•	•	•	•	•	•	•	•	•	•	•	Cool season biennial or annual legume. Viney, trailing or climbing growth. Wide range of soil types, best adapted to loamy and sandy soils.
	Rye Grain ³	<i>Secale cereale</i>	15	0.34	•	•	•	•	•	•	•	•	•	•	•	•	•	Bunch type grain, grows 2-5 feet tall. Full sun, moderate drought tolerance, high salt tolerance.

¹ Common Bermudagrass: Do not use Giant Bermudagrass (NK-37).

² Only use pre-inoculated legumes or use an appropriate inoculant with the seed at planting.

³ Mow Rye Grain (no lower than 3 inches) once it reaches a height of 6-8 inches to reduce competitiveness with permanent vegetation.

⁴ If the Common Name of the seed listed in the Tables is not available, use seed with the listed Botanical Name.

APPENDIX B

DETAILED SEEDING TABLES

Detailed Schedule

Instructions: Find the appropriate table and choose the appropriate seed type from each section. If a seed type is not available for the first column in the first column to choose another seed type. The total number of seed types used should match the number of sections for that category. When applying granular fertilizer, use a 10-10-10 blend unless a soil analysis or known soil conditions warrant a different type.

Non Slope Areas & Road Shoulders and Medians

Common Name ³	Botanical Name	Planting Rate (lbs/acre)	Planting Rate (lbs/1000sq)	Planting Dates												Description	Habitat	Characteristics	
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Behagrass ¹	<i>Paspalum notatum</i>	30	0.7	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Warm season perennial, spreads by rhizomes, grows 1-2 feet tall, deep root system. Sandy soils, shade tolerant, salt tolerant, drought tolerant. Low maintenance, high, coarse blade grass surviving conditions that destroy most turf grasses. Adapts to most soil conditions and is extremely tolerant to wear and traffic.	Sandy and infertile soils, heavy traffic areas, water conveyance channels, Acid soil tolerant, not high pH tolerant. Listed as Significant Threat on SC Invasive list.
Common Bermudagrass ² (unhulled = hull present)	<i>Cynodon dactylon</i>	30	0.7	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Long-lived, warm season perennial, spreads by rhizomes/stems, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement. Used for channels, pond banks, grassed waterways, and vegetated dunes.	Lawns, public areas, problem soils, heavy traffic areas, water conveyance area, pH 5.0-8.0
Common Bermudagrass ² (hulled = hull absent)	<i>Cynodon dactylon</i>	25	0.6	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Long-lived, warm season perennial, spreads by rhizomes/stems, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement. Used for channels, pond banks, grassed waterways, and vegetated dunes.	Lawns, public areas, problem soils, heavy traffic areas, water conveyance area, pH 5.0-8.0
Tall Fescue (KY-31) ³	<i>Festuca arundinacea</i>	50	1.15	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Bunch-type grass, grows 2-4 feet tall. Full sun to part shade. Good heat and drought tolerance as well as shade tolerance. Tolerant to marginal, acidic, and poorly drained soils, and in areas of low fertility, and where stresses occur due to drought. Durable due to an extensive, deep root system.	Lawns, public areas, problem soils, heavy traffic areas, pH 5.5 - 8.0
Carpet Grass / Eremochloa ophiuroides	<i>Arachnopus affinis</i>	15	0.3	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Warm season shallow-rooted creeping perennial grass, dense sod by rooting at nodes along stolons. Poor drought resistance. Thrives under lower fertility. Does not withstand prolonged flooding or permanent swampy conditions.	Slightly acidic sandy or sandy-loam soils with available moisture, pH 5.0-6.0
Perennial Rye Grass ⁴	<i>Lolium perenne</i>	15	0.3	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Fast growing, short term, cool season bunch grass, grows 1-2 feet tall. Full sun, low drought tolerance, moderate salt tolerance.	Medium fertility, acid, clay, and loamy soils, pH 5.27-7.5
White Clover ⁵	<i>Trifolium repens</i>	5	0.1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Grows to 1 foot tall. Full sun, low drought tolerance, low salt tolerance. Good erosion control cover.	Moist soils, field borders, pH 6.0-7.5
Crimson Clover ⁶	<i>Trifolium incarnatum</i>	20	0.5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Upright winter legume, grows from 1-3 feet tall. Full sun, low drought tolerance, no salt tolerance.	Sandy and clay like soils, pH 5.5 - 7.5
Lespedeza ⁵ Kobe / Korean	<i>Lespedeza striata/sipularia</i>	15	0.3	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Low-growing summer legume. Used as pasture and hay legume, erosion control, and on a limited scale for seed production.	Prefers well-drained clay or loamy soil. Tolerates acidic soil, and poorer soil types. Excellent heat and drought tolerance
Browtop Millet ⁶	<i>Panicum ramosum</i>	10	0.2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Bunch-type grain, grows 2-5 feet tall. Full sun, moderate drought tolerance, high salt tolerance.	Infertile, sandy, or acid soils, pH 5.2-8.0
German Millet ⁶ (Foxtail Millet)	<i>Setaria italica</i>	10	0.2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Medium height around 4 feet	Suitable for moist, well-drained sandy, loamy, and clay like soils. Adapts to a wide range of pH. Drought tolerant, shade intolerant.
Heiry Vetch ⁵	<i>Vicia villosa</i>	15	0.3	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Viney, trailing or climbing growth. Stems may grow 2 to 5 feet long. Used for soil improvement along roadsides and for bank stabilization/erosion control	Wide range of soil types, best adapted to loamy and sandy soils, pH 5.0 to 8.2. Prefers well-drained soils with a pH 6.0-7.0. Does poorly in clay or wet fields.
Rye Grain ⁷	<i>Secale cereale</i>	40	0.9	•	•	•	•	•	•	•	•	•	•	•	•	•	•	Bunch-type grain, grows 2-5 feet tall. Full sun, moderate drought tolerance, high salt tolerance.	Infertile, sandy, or acid soils, pH 5.2-8.0

¹ May be used as an optional turf-type permanent cover.
² Common Bermudagrass: Do not use Giant Bermudagrass(NK-37).
³ Tall Fescue (KY-31): Do not use Tall Fescue (Lolium arundinacea).
⁴ Perennial Rye Grass: Do not use Annual Italian Rye grass (Lolium multiflorum).
⁵ Only use pre-inoculated legumes or use an appropriate inoculant with the seed at planting.
⁶ Mow Millet (no lower than 3 inches) once it reaches a height of 18 inches to reduce competitiveness with permanent vegetation.
⁷ Mow Rye Grain (no lower than 3 inches) once it reaches a height of 6-8 inches to reduce competitiveness with permanent vegetation.
⁸ If the Common Name of the seed listed in the Tables is not available, use seed with the listed Botanical Name.

Annuals

COMMON NAME ¹	BOTANICAL NAME	APPROVED SITE(S)	NURSE CROP RATE (lbs/acre)	TEMP COVER RATE (lbs/acre)	Planting Dates*												Use Areas	Description	Habitat	Characteristics
					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC				
Crimson Clover ¹	<i>Trifolium incarnatum</i>	ALL	20	20	●	●	●	●	●	●	●	●	●	●	●	●	ALL	Naturalized Herbaceous Annual Legume	Sandy and clay like soils, pH 5.5 - 7.5.	Upright winter legume, grows from 1-3 feet tall. Full sun, low drought tolerance, no salt tolerance.
Lespedeza ¹ Kobe / Korean	<i>Lespedeza striata stipulacea</i>	Shoulders / Medians, Slopes	15	60	●	●	●	●	●	●	●	●	●	●	●	●	Shoulders / Medians, Slopes	Warm Season Annual Legume	Prefers well-drained clay or loamy soil. Tolerates acidic soil, and poorer soil types. Excellent heat and drought tolerance	Low-growing summer legume. Used as pasture and hay legumes, erosion control, and on a limited scale for seed production.
Browntop Millet ²	<i>Panicum ramosum</i>	ALL	10	40	●	●	●	●	●	●	●	●	●	●	●	●	ALL	Naturalized Herbaceous Annual	Infertile, sandy, or acid soils, pH 5.2-8.0	Bunch type grain, grows 2.5 feet tall. Full sun, moderate drought tolerance, high salt tolerance.
German Millet ² (Foxtail Millet)	<i>Setaria italica</i>	ALL	10	40	●	●	●	●	●	●	●	●	●	●	●	●	ALL	Warm season annual grass	Suitable for moist, well-drained sandy, loamy, and clay like soils. Adapts to a wide range of pH. Drought tolerant, shade intolerant.	Medium height around 4 feet
Japanese Millet ²	<i>Echinochloa crusgalli</i>	Slopes	10	50	●	●	●	●	●	●	●	●	●	●	●	●	Slopes	Warm season annual grass	Suitable for moist, well-drained sandy, loamy, and clay like soils. Adapts to a wide range of pH. Drought tolerant, shade intolerant.	Can be weedy. Medium height around 4 feet
Oats	<i>Avena sativa</i>	Slopes	40	110	●	●	●	●	●	●	●	●	●	●	●	●	Slopes	Winter annual small grain	Suitable for most soil types. Can grow in Very acidic, heavy clay and nutritionally poor soils. Prefers well-drained soil.	Tall stemmy growth in spring up to 3 feet
Hairy Vetch ¹	<i>Vicia villosa</i>	ALL	15	50	●	●	●	●	●	●	●	●	●	●	●	●	ALL	Cool season biennial or annual legume	Wide range of soil types, best adapted to loamy and sandy soils, pH 5.0 to 8.2. Prefers well-drained soils with a pH 6.0-7.0. Does poorly in clay or wet fields	Winey, trailing or climbing growth. Stems may grow 2 to 5 feet long. Used for soil improvement along roadsides and for bank stabilization/erosion control
Pearl Millet	<i>Pennisetum glaucum</i>	Slopes	15	50	●	●	●	●	●	●	●	●	●	●	●	●	Slopes	Tall warm season annual grass	Adapts to coarse and medium textured soils, pH 5.5-8.8. Medium drought tolerance, shade intolerant.	4 to 7 feet growth potential
Sudangrass	<i>Sorghum bicolor</i>	Slopes, Buffers	20	60	●	●	●	●	●	●	●	●	●	●	●	●	Slopes, Buffers	Naturalized Herbaceous Annual	Adapts to most soil types, pH 5.5-8.0	Annual warm season pasture grass, grows 3-5 feet tall. Full sun, to partial shade, drought tolerance, moderate salt tolerance.
Barley	<i>Hordeum vulgare</i>	Slopes	55	110	●	●	●	●	●	●	●	●	●	●	●	●	Slopes	Winter annual small grain	Adapts to medium textured soils, pH 5.0-8.5. Medium drought tolerance, shade intolerant.	Tall stemmy growth in spring
Wheat ⁴	<i>Triticum spp.</i>	Slopes, Buffers	35	110	●	●	●	●	●	●	●	●	●	●	●	●	Slopes, Buffers	Winter annual small grain	Adapts to a wide range of soils, but prefers fertile, well-drained soils.	Tall stemmy growth in spring. Leaf blades flat, stems 1 to 4 feet, thick spikes, two to four sided.
Rye Grain ^{3,4}	<i>Secale cereale</i>	ALL	40	110	●	●	●	●	●	●	●	●	●	●	●	●	ALL	Naturalized Herbaceous Annual	Infertile, sandy, or acid soils, pH 5.2-8.0	Bunch type grain, grows 2.5 feet tall. Full sun, moderate drought tolerance, high salt tolerance.

¹ Only use pre-inoculated legumes or an appropriate inoculant with the seed at planting.

² Mow Millet (no lower than 3 inches) once it reaches a height of 18 inches to reduce competitiveness with permanent vegetation.

³ Rye Grain: Do not use Perennial Rye Grass or Annual Italian Rye Grass (*Lolium multiflorum*).

⁴ Mow Wheat and Rye Grain (no lower than 3 inches) once they reach a height of 6-8 inches to reduce competitiveness with permanent vegetation.

⁵ If the Common Name of the seed listed in the Table is not available, use seed with the listed Botanical Name.

APPENDIX C

SPARTANBURG COUNTY

STABILIZATION CERTIFICATION FORM

PERMANENT COVER: complete entire chart		Y E S	N O	APPLIED TOTAL		APPLIED RATE ¹		RECOMMENDED RATE	
TEMP COVER BY SEEDING: complete green shaded items only									
SEED TYPES:					lbs		lb/ac		lb/ac
					lbs		lb/ac		lb/ac
					lbs		lb/ac		lb/ac
					lbs		lb/ac		lb/ac
					lbs		lb/ac		lb/ac
					lbs		lb/ac		lb/ac
					lbs		lb/ac		lb/ac
FAST ACTING LIME <input type="checkbox"/> LIQUID <input type="checkbox"/> DRY					lbs or gal		lbs or gal/ac		lbs or gal/ac
AG GRANULAR LIME (from soil analysis)					lbs		lb/ac		lb/ac
BIOLOGICAL GROWTH STIMULANT					gal		gal/ac		gal/ac
SLOW RELEASE NITROGEN (N) (from soil analysis) ²					lbs		lb/ac		lb/ac
PHOSPHORUS (P2O5) (from soil analysis) ³					lbs		lb/ac		lb/ac
POTASSIUM (K2O) (from soil analysis) ⁴					lbs		lb/ac		lb/ac
MULCH TYPE : <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 Product Name _____					lbs		lb/ac		lb/ac
MULCH APPLIED AT RECOMMENDED RATE PER MULCH TABLE?					N/A		N/A		N/A
EROSION CONTROL BLANKET (ECB) Product Name _____					ft ²		N/A		N/A
TURF REINFORCEMENT MAT (TRM) TYPE <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 Product Name _____					ft ²		N/A		N/A
WOOD CHIP OR COMPOST MULCH					cy		cy/ac		cy/ac
SOIL AMENDMENT: HBSA					lbs		lb/ac		lb/ac
SOIL AMENDMENT: COMPOST OR TOPSOIL					cy		cy/ac		cy/ac

¹ Applied Rate (units/ac) = Applied Total (units) / Application Area (acres)

² bag wt.(lbs) _____ x # bags _____ x % Nitrogen (N)/bag _____ = total applied weight (lbs) of (N) _____

³ bag wt.(lbs) _____ x # bags _____ x % Phosphorus (P205)/bag _____ = total applied weight (lbs) of (P205) _____

⁴ bag wt.(lbs) _____ x # bags _____ x % Potassium (K)/bag _____ = total applied weight (lbs) of (K) _____

MULCHES AND HYDRAULIC EROSION CONTROL PRODUCTS (HECPs): Use mulches and HECPs in compliance with the mulch table below and verify using this form.

MULCH APPLICATION TABLE

Mulch	Applicable Slopes (H:V) ¹	Minimum Application Rate (lbs/acre -dry) ²	50 Pound Bags Per Acre
Wood Chip	≤ 3:1	500 CY/acre	--
Straw or Hay with Tackifier	≤ 4:1	2,000	--
HECP Type 1	≤ 4:1	2,000	40
HECP Type 2	4:1 < S ≤ 3:1	2,500	50
HECP Type 3	3:1 < S ≤ 2:1	3,000	60
HECP Type 4	2:1 < S ≤ 1:1	3,500	70
	>1:1	4,000 (temp cover only) ³	80
Compost Mulch	≤ 2:1	200 CY/acre	--

- 1 The maximum allowable continuous slope length for all mulch applications is 50 feet. Slope interruption devices or TRMs are required for continuous slope length longer than 50 feet.
- 2 Strictly comply with the manufacturer’s mixing recommendations for the actual slope steepness and the actual continuous slope length of the application.
- 3 HECP Type 4 may be used for permanent cover applications on slopes 1:1 or greater at a minimum rate of 4,500 pounds per acre only when proper TRM installation is not practicable due to site constraints. **Slope interruption devices are required for continuous slope length longer than 25 feet under these circumstances.**
- 4 When site constraints exceed the acceptable application for Mulch, use Rolled Erosion Control Products (RECPs); Erosion Control Blankets (ECB) or Turf Reinforce Matting (TRM) as appropriate.

Maximum Application Slope (XH:1V): _____ **Maximum Slope length (feet):** _____

Correct Mulch applied to applicable maximum slope: YES NO NA

Mulch applied to maximum slope length of 50 feet: YES NO NA

Slope interruption devices or TRMs are used for continuous slope lengths longer than 50 feet: YES NO NA

Mulch is applied with a minimum continuous soil coverage of 95% across the entire application area: YES NO NA

ROLLED EROSION CONTROL PRODUCTS (RECPS): RECPS include Temporary Erosion Control Blanket (ECB) and Permanent Turf Reinforcement Matting (TRM). Use RECPS in compliance with the table below and verify using this form.

ECB and TRM APPLICATION TABLE

ECB/TRM Type ¹	Slope (H:V) ²	Minimum Slope Length (ft)
Temporary ECB or Type 1 TRM	≤ 2:1	5
Type 2 TRM	≤ 1.5:1	5
Type 3 TRM	≤ 1:1	5

- 1 Strictly comply with the manufacturer’s specifications.
- 2 The maximum allowable continuous slope length for ECBs is 50 feet. Slope interruption devices or TRMs are required for continuous slope length longer than 50 feet.

Maximum Application Slope (XH:1V): _____ **Maximum Slope length (feet):** _____

Correct RECPS applied to applicable maximum slope: YES NO NA

ECB applied to maximum slope length of 50 feet: YES NO NA

Slope interruption devices or TRMs are used for continuous slope lengths longer than 50 feet: YES NO NA

SOIL AMENDMENTS: Soil amendments include Hydraulic Biotic Soil Amendments (HBSAs), Compost, and Topsoil. Use soil amendments if site soils are determined to be deficient based on the results of the soil analysis and verify using this form.

Specifically, use a soil amendment in the following scenarios:

- **Organic matter test results are less than 3.0%.**
- Soil is excessively nutrient deficient to the extent of requiring costly fertilizer additions.
- **Soil has excessively low pH values (lower than 5.0)** to the extent of requiring costly lime additions.
- pH adjustment requires an addition of lime greater than 6,000 lbs/ac.
- When directed by the Engineer because of known or anticipated difficulty establishing vegetation.

Soil Organic Matter Test Results (%) _____ **Soil pH value (0.0 to 14.0)** _____

Soil Amendments required based on the above criteria: YES NO NA

Type of Soil Amendment provided: HBSA Compost Topsoil NA

Soil Amendments applied with a minimum continuous soil coverage of 95% across the entire application area: YES NO NA