
Greenville County Technical Specification for:
EC-03: SEEDING & STABILIZATION

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1.0 STABILIZATION INTRODUCTION

This *Stabilization Specification* is developed to improve the success of seeding/stabilization efforts in Greenville County, South Carolina. It includes appropriate seed mixes and application rates for different seeding locations/applications and the appropriate planting dates. Following the recommendations of this *Specification* should reduce the number of times a site has to be re-seeded and the time it takes to achieve acceptable temporary and permanent stabilization. This *Specification* also includes recommendations for proper lime, fertilizer, biological growth stimulant, and soil amendment use to achieve site stabilization.

Construction General Permit Stabilization Requirement (Section 3.2.6 A.I.(a))

Initiate soil stabilization measures as soon as practicable whenever land-disturbing activities have been temporarily or permanently ceased, but in no case more than 14 days after land-disturbing activity in that portion of the construction site has temporarily or permanently ceased, except:

- (i). Where snow cover or frozen ground conditions preclude stabilization by the 14th day, stabilization measures must be initiated as soon as practicable.*
- (ii). Where construction activity on a portion of the construction site is temporarily ceased, and earth-disturbing activities will be resumed within 14 days, temporary stabilization measures do not have to be initiated on that portion of the construction site.*

1.1 TEMPORARY STABILIZATION

Temporary stabilization is defined as a condition where exposed soils or disturbed areas are provided a temporary vegetative and/or non-vegetative protective cover to prevent erosion and sediment loss. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until either final stabilization can be achieved or until further construction activities take place to re-disturb this area.

The purpose of temporary stabilization is to reduce erosion and sedimentation by stabilizing disturbed areas that would otherwise lay bare for long periods of time before they are worked or stabilized. Temporary stabilization is also used where permanent cover is not necessary or appropriate.

Use temporary stabilization on exposed soil surfaces such as denuded areas, soil stockpiles, dikes, dams, banks of sediment basins, banks of sediment traps, and temporary road banks. Temporary stabilization has the potential to prevent or limit costly maintenance operations on other sediment control structures. Sediment clean-out requirements for sediment basins, sediment traps and silt fence can be reduced if the drainage is stabilized where grading and construction operation are not taking place.

Initiate temporary stabilization by mulch or temporary stabilization by seeding within 7 calendar days where land disturbing activities have temporarily ceased on the Project and will not resume for a period exceeding 14 calendar days. 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.

Temporary stabilization by seeding is required if the Project will not be worked for a period longer than 60 days.

Initiate temporary stabilization measures as soon as practicable for areas where initiating temporary stabilization measures within 7 days is infeasible (e.g., where snow cover, frozen ground, or drought conditions preclude stabilization).

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.

1.1.1 Acceptance of Temporary Stabilization

Before acceptance of temporary stabilization by the *regulatory agency* and the *Design Engineer or Landscape Architect*, temporary stabilization is required that is sufficient to control erosion for a given area and length of time before the next phase of construction or the establishment of permanent seeding 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 PERMANENT STABILIZATION

1.2.1 Final Stabilization

Final Stabilization

1. *Means that all land-disturbing activities at the construction site have been completed and that on all areas not covered by permanent structures, either*
 - a. *A uniform (e.g., evenly distributed, without large bare areas) vegetative cover with a density of 70 percent of the natural background vegetative cover has been established excluding areas where no natural background vegetative cover is possible (e.g., on a beach), or*
 - b. *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 vegetation.*
2. *For individual lots in residential construction, final stabilization means that either:*
 - a. *The homebuilder has completed final stabilization as specified above; or*
 - b. *The homebuilder has established temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization.*
3. *For construction Projects on land used for agricultural purposes (e.g., pipelines across crop or range land, staging areas for highway construction, etc.), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to "Surface Waters of the State," and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria (1) or (2) above.*

1.2.2 Permanent Seeding

Initiate permanent seeding within 7 calendar days where land disturbing activities have permanently ceased on the Project. Where land disturbing activities are resumed within 14 days, stabilization measures are not required to be initiated on that portion of the Project. Initiate permanent seeding measures as soon as practicable for areas where initiating permanent seeding measures within 7 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 any deposited sediment and graded to the required permanent detention basin configuration. Ensure the seedbed for the permanent seeding is established in accordance with this *Specification*.

1.2.3 Acceptance of Permanent Seeding

Before acceptance of permanent seeding by the *regulatory agency* and the *Design Engineer or Landscape Architect*, a uniform permanent perennial vegetative cover with a 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.

Final stabilization of the site requires that it be covered by a 70 percent coverage rate. This does not mean that 30 percent of the site can remain bare. The coverage is defined as looking at a square yard of coverage, in which 70 percent of that square yard is covered with vegetation.

1.3 PERMANENT GROUND COVER PLANTS

Initiate permanent ground cover plant applications within 7 calendar days where land disturbing activities have permanently ceased on the Project. Initiate permanent ground cover plant applications measures as soon as practicable for areas where initiating permanent ground cover plant applications within 7 days is infeasible (e.g., where snow cover, frozen ground, or drought conditions preclude stabilization). The use of native species is preferred when selecting vegetation.

1.3.1 Acceptance of Permanent Cover

Before acceptance of permanent cover by the *regulatory agency* and the *Design Engineer or Landscape Architect*, a uniform perennial vegetative cover with a density of 70% of each square yard of the 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.

1.4 Sod

Initiate Sod applications within 7 calendar 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 7 days is infeasible (e.g., where snow cover, frozen ground, or drought conditions preclude stabilization). Use Sod on slopes less than 2H:1V.

1.4.1 Acceptance of Sod

The *Design Engineer or Landscape Architect* will inspect Sod applications for acceptance. Acceptance is 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 sufficient to survive dry periods and winter weather and is capable of reestablishing in the spring.

2.0 SEEDING

2.1 SEED SCHEDULE

The *Design Engineer or Landscape Architect* will select a seeding plan utilizing the seeding schedules included in Appendix I or II for all temporary cover by seeding and permanent seeding applications.

2.2 SIMPLIFIED SEEDING SCHEDULE

The *Design Engineer or Landscape Architect* will use the exact Simplified Seeding Schedule as listed in Appendix I for the specific seeding application/location and applicable planting date. Non Slope Areas are defined as areas flatter than a 4H:1V or areas with a grade less than 25%.

2.3. DETAILED SEEDING SCHEDULE

The *Design Engineer or Landscape Architect* will use the Detailed Seeding Schedule as listed in Appendix II for the specific seeding application/location and applicable planting date. For details on mixes consult the Greenville Soil and Water Conservation District (864-467-2755, 108)

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

In accordance with Appendix II, specify a minimum of two (2) perennial seed types for all permanent seeding for Non Slope Areas based on the specific application and the availability of the seed. A minimum of one (1) of the seed types specified must be a turf-type species. When specifying two (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.

The *Design Engineer or Landscape Architect* must also specify a minimum of one (1) acceptable annual nurse crop species, or a mix of two (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.

In accordance with Appendix II, specify a minimum of one (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 shown.

2.3.2 Slopes

In accordance with Appendix II, specify a minimum of three (3) perennial seed types for all permanent seeding for Slope Areas based on the specific application and the availability of the seed. A minimum of one (1) of the seed types specified must be a turf-type species. When utilizing three (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.

The *Design Engineer or Landscape Architect* must also specify a minimum of one (1) acceptable annual nurse crop species, or a mix of two (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.

In accordance with Appendix II, specify a minimum of two (2) annual seed type for all temporary cover by seeding for Slope Areas based on the specific application and the availability of the seed.

2.3.3 Road Medians / Shoulders and Non Slope Utility Applications

In accordance with Appendix II, specify a minimum of one (1) perennial turf-type species and one (1) acceptable annual nurse crop species for road medians, road shoulders and Non Slope Utility applications. If a mix of two (2) or more annual nurse crops species is selected, specify one species at a minimum rate of approximately 75% of the recommended rate shown and specify the other species at a rate that does not exceed approximately 50% of the recommended rate shown.

2.4 SEED REQUIREMENTS

Use seed that conforms to all state laws and all requirements and regulations of the South Carolina Department of Agriculture (SCDA). Seeds containing species designated by the State Crop Pest Commission as a plant pest (i.e., noxious weeds) are not permitted. Use seed that is individually packaged or bagged and tagged. Each 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 weed seed is present, provide a 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 *Design Engineer or Landscape Architect* or *INSPECTOR* 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 SEEDING AMENDMENTS

The soil pH value is a measure of soil acidity or alkalinity. Soil pH directly affects nutrient availability to the grass. The pH scale ranges from 0 to 14, with 7 as neutral. Numbers less than 7 indicate acidity while numbers greater than 7 indicate alkalinity.

The soil pH value directly affects nutrient availability to grasses and grass tends to grow best in slightly acidic soils (pH 5.8 to 6.5). Soil pH values above or below this range may result in less vigorous growth and nutrient deficiencies.

Nutrients for healthy grass growth are divided into three categories: primary, secondary and micronutrients. Nitrogen (N), phosphorus (P) and potassium (K) are primary nutrients which are needed in fairly large quantities compared to the other plant nutrients. Calcium (Ca), magnesium (Mg) and sulfur (S) are secondary nutrients which are required by the plant in lesser quantities but are no less essential for good plant growth than the primary nutrients. Zinc (Zn) and manganese (Mn) are micronutrients, which are required by the plant in very small amounts. Most secondary and micronutrient deficiencies are easily corrected by keeping the soil at the optimum pH value.

The major impact that extremes in pH have on plant growth is related to the availability of plant nutrients or the soil concentration of plant-toxic minerals. In highly acid soils, aluminum and manganese can become more available and more toxic to the plant. At low pH values, calcium, phosphorus and magnesium are less available to the plant. At pH values of 6.5 and above, phosphorus and most of the micronutrients become less available.

Reaching and maintaining a proper pH level is the most important step in establishing and maintaining a healthy stand of grass.

3.1 LIME

3.1.1 Agricultural Granular Lime

Use solid agricultural granular lime for all permanent seeding applications and Sodding applications that is agricultural grade, standard ground limestone. Ensure that 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.

3.1.2 Applying Granular Lime

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

Following advance seedbed preparation, uniformly spread solid agricultural granular lime over the designated areas. Solid agricultural granular lime may be applied by approved 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. Do not apply more than 2,500 lbs/acre of agricultural lime in a single application.

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

3.1.3 Fast Acting Lime

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

3.1.4 Applying Fast Acting Lime

Fast acting liquid and dry lime provides an immediate pH adjustment. 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 approved mechanical spreaders or by hydraulic methods as a mixture with the seed.

3.2 FERTILIZER

3.2.1 Granular Fertilizer

Use granular fertilizer for all permanent seeding applications and all Sodding applications. The proper fertilizer mixture is dependent on the existing soil conditions and it is recommended that a soil analysis be performed if the soil conditions are uncertain in the area of fertilizer application.

In a mixed fertilizer such as 10-10-10, the first number represents the percent of nitrogen required, the second number represents the percent of phosphorus, and the third number represents the percent of water soluble potassium in the fertilizer. **Use fertilizer that incorporates a minimum of 50% water insoluble (slow release) nitrogen. Animal by-product or municipal waste fertilizers are not acceptable under this *Specification*.**

Unless a soil analysis is performed to determine otherwise, a good rule of thumb granular fertilizer to apply in the Upstate of South Carolina is 10-10-10. In no case should a 20-20-20 fertilizer be used due to the potential burning of the seedbed.

3.2.2 Applying Granular Fertilizer

Fertilizer may be applied by approved 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 $\pm 10\%$ of the weight recommendation of the soil analysis. Apply fertilizer that is within ± 2 percentage points of the recommendation of the soil analysis.

The required application of nitrogen includes a minimum of 50% water insoluble (slow release) nitrogen under this *Specification*.

3.3 COMPOST SOIL AMENDMENT

For seedbeds that have little or no topsoil, are highly acidic, or are lacking sufficient nutrients to sustain a health stand of grass, furnish, place, and mix certified weed free compost to a minimum depth of 3 inches into the seedbed in order to ensure a good stand of grass. Provide compost when seedbeds are excessively nutrient deficient to the extent of requiring costly fertilizer additions and or have excessively low pH values (lower than 5.0) based on the results of a soil test. Compost requirements are described in Section 4.3.

3.4 BIOLOGICAL GROWTH STIMULANTS

Provide biological growth stimulants for all permanent seeding, Sodding, and temporary seeding applications. Use biological growth stimulants that provide an immediate seedbed adjustment to help stimulate seed germination, improve the availability of nutrients to the grass, increase the number and depth of root development, and generate robust plant growth which is more tolerant of changes in environmental conditions.

Use biological growth stimulants that:

- Contain components to improve nutrient and water uptake by the plant,
- Contain plant growth hormones which act as a stimulant to improve vegetative growth and intake of micro nutrients and can reduce damage from disease and insect infestation, and
- Contain components that increases biological activity in the soil to improve stress tolerance/drought resistance, reduces sodium uptake in sandy soils, provides more phosphorus availability, and increases cation exchange capacity resulting in earlier germination and better root establishment.

Provide biological growth stimulants that contain compounds such as:

- Humic acid (humates),
- Humectants,
- Cold water processed seaweed/kelp extract,
- Beneficial microbes,
- Cytokinins,
- Gibberellins,
- Auxins (growth hormones), and
- Endo-mycorrhizae.

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*.

Provide biological growth stimulants composed of non-toxic materials. Provide Biological Growth Stimulants that have no germination or growth inhibiting factors and do not form a water-resistant crust that can inhibit plant growth. Furnish biological growth stimulants where all components are pre-packaged by the manufacturer to assure material performance and compliance with the minimum requirements in Table 1.

Table 1: Minimum Biological Growth Stimulant Requirements

BGS Property	Test Method	Required Value
Physical		
Acute Toxicity	ASTM 7101 EPA Method 2021 or EPA Method 2002	Non Toxic
Performance		
Seed Germination	ASTM D7322 ¹	200% minimum
Plant Height	ASTM D7322 ¹	200% minimum
Plant Mass	ASTM D7322 ¹	110% minimum

¹ ASTM test methods developed for RECPs that have been modified for comparison to control between 14 and 21 days.

3.4.1 Applying Biological Growth Stimulants

When using biological growth stimulants, it is important to 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.

4.0 EROSION PREVENTION PRACTICES

4.1 MULCH

Mulch is required for all permanent seeding, temporary seeding, and temporary cover applications except for road shoulder work that has a disturbed width less than six (6) feet and where seeding is compacted using a culti-packer or light roller. Compaction is not necessary if seeds are planted by mechanical seed drills that perform a compaction procedure.

Only use mulch that is certified weed free. *Wood chip mulch is not acceptable for seeding applications.*

Do not use Mulch in areas where concentrated flow is expected.

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 this situation.

Apply mulch according to Table 2.

TABLE 2: MULCH APPLICATIONS

Mulch	Applicable Slopes (H:V) ¹	Minimum Application Rate (lbs/acre -dry) ²
Wood Chip	≤ 4:1	500 CY/acre
Straw or Hay with Tackifier	≤ 4:1	2,000
HECP Type 1	≤ 4:1	2,000
HECP Type 2	4:1 < S ≤ 3:1	2,500
HECP Type 3	3:1 < S ≤ 2:1	3,000
HECP Type 4	2:1 < S ≤ 1:1	3,500
	>1:1	4,000 (temp cover only) ³
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.

4.1.1 Wood Chip Mulch

*Wood chip mulch is **not** acceptable for seeding applications.* Apply wood chips to a minimum depth of 3 to 4 inches using a blower, chop handler, or by hand. If wood chip mulch is used for temporary cover by mulch, it must be removed prior to performing permanent seeding.

4.2 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 approved sources. Use materials that are reasonably dry and reasonably free from mature seed-bearing stalks, roots, or bulblets of Johnson grass, Nutgrass, Sandburg, Wild Garlic, Wild Onion, Wild Mustard, Crotonaria, Pigweed, Witchweed, and Cocklebur. Comply with all state and federal domestic plant quarantine regulations. Do not use Straw 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 mulch material using one of the following tacking agents:

4.2.1 Organic or Chemical Tackifier

These tackifiers 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 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.

4.2.2 Hydraulic Straw Tackifiers

Apply hydraulic erosion control tackifiers at the manufacturer's recommended rate for straw binding.

4.2.3 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.

4.2.4 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 appropriate mechanical spreaders, or by blowers. Apply straw 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.

4.3 COMPOST MULCH

Compost is the product resulting from the controlled biological decomposition of organic material occurring under aerobic conditions that has been sanitized through the generation of heat and stabilized to the point that it is appropriate for its particular application. Ensure compost possesses no objectionable odors or substances toxic to plants and does not resemble the raw material from which it was derived. Provide compost only from a compost producer that participates in the United States Composting Council's (USCC) Seal of Testing Assurance (STA) program.

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
- 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 a compost mulch. ***Do not use mixed municipal solid waste compost.***

4.3.1 Applying Compost Mulch

Avoid very coarse compost with particles larger than 3 inches if the application is seeded, as it will make vegetation establishment more difficult.

Ensure that the areas to receive compost 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 two (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 two (2) inch depth and no less than a one (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 an approved 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 three (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 the compost, perform temporary cover by seeding or permanent cover using hydraulic methods for seed application utilizing a HECF Type 1 as a tracer at a minimum rate of 1000 pounds/acre.

4.4 HYDRAULIC EROSION CONTROL PRODUCTS (HECPs)

Use Hydraulic Erosion Control Product (HECPs) as an allowable mulch for temporary cover by mulch, temporary cover by seeding or permanent cover by seeding applications as outlined In this *Specification*. Do not use HECPs as a channel liner or for areas receiving concentrated flow. Refer to the current *Specification for HECPs* for HECP description, materials, and construction requirements.

4.5 EROSION CONTROL BLANKET (ECB) AND TURF REINFORCEMENT MATTING (TRM)

Consider the use of Temporary Erosion Control Blankets (ECB) and/or Turf Reinforcement Matting (TRM) for permanent seeding application areas 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 3 to determine appropriate applications of ECB and TRM.

TABLE 3: ECB and TRM APPLICATIONS

ECB/TRM Type¹	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.

Refer to the current *Specification for Rolled Erosion Control Products (RECP)* for Temporary Erosion Control Blanket (ECB) and Turf Reinforcement Matting (TRM) description, materials, and construction requirements.

4.5.1 Installing ECB and TRM

It is very 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 the City Engineer be involved when ECBs or TRMs are installed to aid in the selection process as well as the performance evaluation.

4.6 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.

4.6.1 Slope Interruption Device Materials

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

Provide slope interruption devices that exhibit the following properties:

- Machine produced by a manufacturer experienced in sediment tube manufacturing.
- Materials are certified 100% weed free.
- When curled excelsior wood fiber is used, 80% of the fiber materials are a minimum of four (4) inches in length.
- When washed shredded recycled rubber particles are used, a minimum of 98% of metal is removed.
- Materials are enclosed by a tubular, flexible outer netting treated with ultraviolet stabilizers.

Do not use straw, curled excelsior wood, or natural coconut rolled erosion control products (RECPs) that are rolled up to create a slope interruption device.

Provide stakes or other means to stabilize non-weighted slope interruption devices to keep them safely in place. Provide a slope interruption device that meets the minimum performance requirements shown in the Table 4.

TABLE 4: SLOPE INTERRUPTION DEVICE MATERIAL SPECIFICATIONS

Property	Test Method ¹	Value
Pre-installed Diameter	Field Measured	6.0 inch to 12.0 inch
Mass per Unit Length	Field Measured	6 inch = 1.0 lbs/ft minimum 12 inch = 2.0 lbs/ft minimum
Length per Tube	Field Measured	6 foot minimum
Filtering Efficiency Performance	ASTM D5141 or ASTM D7351	80% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D4491 or Equivalent	100 gal/min/ft ² minimum
Netting Ultraviolet Stability (retained strength after 500 hr)	ASTM D4355	70%

4.6.2 Slope Interruption Device Installation

Install slope interruption devices for Hydraulic Erosion Control Products (HECPs) applications prior to the HECP installation. Excavate a trench along (parallel) the contour of the slope to a depth that is 1/3 the tube diameter. Place the excavated soil on the up-slope side of the trench. Place the slope interruption device into the trench so it contours to the soil surface, ensuring no gaps exist 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 non-weighted slope interruption devices for Temporary Erosion Control Blankets (ECB) application after the ECB installation on top of the ECB. Tube trenching is not required for ECB applications. Ensure the installation of the slope interruption device does not damage the installed ECB.

Install non-weighted slope interruption devices using wooden stakes with a minimum length of 3 feet with a minimum measured dimension of 3/4 inch x 3/4 inch and a maximum measured dimension of 1 inches x 1 inches. 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 non-weighted 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.

5.0 SEEDING CONSTRUCTION REQUIREMENTS

5.1 SEEDING DATES AND RATES OF APPLICATION

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

- The ground is frozen and/or when the 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.

5.2 SEEDBED PREPARATION

- Ensure that the 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 in order to provide for more effective erosion control and for ease of subsequent mowing operations.
- Loosen the seedbed (including cut slopes) to a minimum depth of three (3) inches before initiating permanent seeding and temporary seeding.
- An acceptable method of preparing the seedbed on slopes is vertically tracking the seedbed up and down the slope with proper equipment.
- Remove stones larger than two and one-half (2½) inches in any dimension, large dirt clods, roots, or other debris brought to the surface.
- Use compost if good seedbed material is not located on site or results of the soil test show the seedbed is excessively nutrient deficient to the extent of requiring costly fertilizer additions and or have excessively low pH values (lower than 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.

5.3 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.

5.4 TEMPORARY COVER BY SEEDING

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

Uniformly sow seed at the rate specified by the use of approved 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* 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 *Design Engineer or Landscape Architect*. The *CONTRACTOR* may add granular lime and fertilizer as necessary to enhance growth.

If the vegetation does not grow quickly or thick enough to prevent erosion, re-seed the area as soon as possible. Keep seeded areas adequately moist. Irrigate the seeded area if normal rainfall is not adequate for the germination and growth of seedlings. Water seeded areas at controlled rates that are less than the rate at which the soil can absorb water to prevent runoff. Runoff of irrigation water wastes water and can cause erosion.

Temporary cover by 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.

5.5 PERMANENT SEEDING

Following the preparation of the seedbed according to this *Specification*, perform permanent seeding within 5 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 the seed specified in the seeding tables in Appendix I and II of this *Specification* and as shown on the Plans to produce the required stand of grass and follow the application procedures of this *Specification*. Uniformly sow seed at the rate specified by the use of approved 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 5 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 *Design Engineer or Landscape Architect*. Add fertilizer and lime as required by a soil test.

5.6 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.

6.0 SOD

Sod is appropriate for any graded or cleared area that may erode, and where a permanent cover is immediately needed. Examples of sodding applications include yards, buffer zones, streambanks, dikes, swales, slopes, outlets, level spreaders and filter strips. Do not use sodding on slopes steeper than 2H:1V, and if sodding is mowed, do not place it slopes greater than 3H:1V.

6.1 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.

6.2 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 three (3) inches before placing Sod.
- To ensure a good stand of Sod grass in areas where the existing Sod Bed has little or no topsoil, furnish and place topsoil or compost in the Sod Bed.
- Lay Sod when the Sod Bed is moist. If necessary, moisten dry Sod Beds before sod is laid.

6.3 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 $\frac{3}{4}$ inch. The measurement for thickness excludes top growth and thatch.

6.4 SOD INSTALLATIONS

Typically Sod is used on small commercial projects and residential developments. Ensure that 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 in a particular area 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 approved 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.
- Permanent, 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.

7.0 PERMANENT GROUND COVER PLANTS

Permanent Ground Cover Plants are appropriate for any graded or cleared area that may erode, and where a permanent cover is immediately needed. Examples of permanent ground cover plant applications include yards, naturalized areas, buffer zones, stream banks, and slopes.

7.1 PLANTING PLAN

A permanent ground cover plant landscape plan includes all planting types, total number of each species, and the location of each species used. The plan includes a description of the *CONTRACTOR*'s responsibilities including a planting schedule, installation specifications, initial maintenance, a warranty period, and expectations of plant

survival. A planting plan includes long-term inspection and maintenance guidelines. Use planting plans prepared by a qualified landscape architect, botanist or qualified extension agent. Use native plant species over non-native species.

7.2 INSTALLATIONS

Plant all permanent ground cover plant grasses, native grasses, perennials, shrubs, trees, and other plant materials specified to applicable landscaping standards. Ensure all plants are installed in accordance with the permanent ground cover plant a landscape plan.

Ensure all plant materials are kept moist during transport and on-site storage.

Trees and Shrubs: Water requirements will vary according to the soil and plant. Follow these general guidelines during the first year after planting:

Water when plants show signs of wilting before noon. Plants should generally receive 1- to 1½-inches of water every 5 to 7 days, either from irrigation or rainfall. Wet soil to a depth of 8- to 10-inches. Never water by wetting only the surface. Fertilize sometime in early spring with a fertilizer high in nitrogen.

Vines and Ground Covers: Trim old growth as needed to improve appearance of ground covers. Most covers need once-a-year trimming to promote growth. Maintain mulch cover with additions of mulch where needed. Fertilize every 3 to 4 years once the cover is established.

8.0 INSPECTION AND MAINTENANCE

8.1 INSPECTION

Ensure that all seed, Sod, fast acting lime, biological growth stimulants, agricultural granular lime, granular fertilizer, 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 *Design Engineer or Landscape Architect*, a member of the *Design Engineer or Landscape Architect* staff, or the *INSPECTOR*. The *Design Engineer or Landscape Architect*, member of the *Design Engineer or Landscape Architect* staff, or *INSPECTOR* must document on-site that these materials are applied according to this *Specification* by completing and signing proper forms.

Inspect seeded areas for failure and make necessary repairs and re-seed immediately. Conduct a follow-up survey after one year and replace failed plants where necessary.

If vegetative cover is inadequate to prevent rill erosion, overseed and fertilize in accordance with soil test results.

If a stand of permanent vegetation has less than 40 percent cover, re-evaluate choice of plant materials and quantities of lime and fertilizer.

Re-establish the stand following seed bed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results.

If the season prevents re-sowing, mulch is an effective temporary cover.

8.2 MAINTENANCE

Perform all maintenance necessary to keep permanent seeding, temporary cover by 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 cover by 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.

8.2.1 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 road shoulders and medians when vegetation reaches a height of approximately eighteen (18) to twenty four (24) inches.

Do not perform excessive mowing of Slopes resulting in ruts, furrows or grooves. Do not perform excessive mowing of Slopes that inhibits the establishment of the slope vegetation.

Ensure that mowing results in a uniform vegetation height of four (4) to six (6) inches, unless otherwise directed by the *Design Engineer or Landscape Architect*. 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 the 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 *Design Engineer or Landscape Architect*.

Do not perform mowing when soil and weather conditions are such that rutting or other damage to the Project may occur

8.3. 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, 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 I

SIMPLIFIED SEEDING TABLES

Instructions: Find the appropriate table and choose the appropriate seed type from each section. If a seed type is not available for the needed month, follow the directions 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

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/1000sf)	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/1000sf)	Planting Dates												Characteristics	
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
✓ Tall Fescue (KY-31)	<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.
✓ 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.

Road Medians & Shoulders

Spring / Summer Road Median & Shoulders (during establishment, mow when Millet reaches 18-inches in height)

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		
 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, salt tolerant, high nitrogen requirement.
 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 Road Median & Shoulders (during establishment, mow when Rye reaches 6 to 8-inches in height)

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 aruninacea</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, spreads by rhizomes/stolons seed, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement.
 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)

	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		
Pick 1	Tall Fescue (KY-31)	<i>Festuca aruninacea</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>	15	0.34				●	●	●	●							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>	5	0.11			●	●	●	●	●	●						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)

	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 aruninacea</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>	5	0.11	●	●	●							●	●	●	●	Warm season bunch grass, grows 3 feet tall. Full sun, high drought tolerance.
Pick 1	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 II

DETAILED SEEDING TABLES

TABLE II-1: DETAILED SEEDING PERRENIALS

For details on mixes consult the Greenville Soil and Water Conservation District (864-467-2755, 108)

* Months shaded in green represent applicable planting dates

COMMON NAME ⁷	BOTANICAL NAME	APPROVED SITE(S)	PLANTING RATE (lbs/acre)	Planting Dates*											
				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TURF-TYPE GRASSES (SELECT ONE MINIMUM)															
Bahiagrass ¹	Paspalum notatum	ALL	30												
Common Bermudagrass ² (hulled = hull absent)	Cynodon dactylon	ALL	25												
Common Bermudagrass ² (unhulled = hull present)	Cynodon dactylon	ALL	30												
Tall Fescue (KY-31) ³	Festuca arundinacea	ALL	50												
GRASSES (SELECT ONE MINIMUM)															
Weeping Lovegrass	Erograstis curvula	Slopes	5												
Indiangrass	Sorghastrum nutans	Slopes, Buffers	10												
Little Bluestem	Andropogon scoparius	Slopes, Buffers	10												
Coastal Panicgrass	Panicum amarum	Slopes, Buffers	20												
Switchgrass	Panicum virgatum	Slopes, Buffers	10												
Perennial Rye Grass ⁴	Lolium perrene	ALL	15												
Virginia Wild Rye	Elymus virginicus	Slopes, Buffers	6												
LEGUMES⁵ (SELECT ONE MINIMUM)															
White Clover	Trifolium repens	ALL	5												
Crownvetch	Coronilla varia	Slopes, Buffers	25												
Sericea Lespedeza ⁶ (Scarified seed)	Lespedeza cuneata	Slopes	50												
Sericea Lespedeza ⁶ (Unscarified seed)	Lespedeza cuneata	Slopes	80												

¹ May be used in select areas at the discretion of Greenville County LDD.

* Months shaded in green represent applicable planting dates

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 multiforum).*

⁵ Only use pre-inoculated legumes or use an appropriate inoculant with the seed at planting.

⁶ Use Sericea Lespedeza on Slopes where other species will not adequately thrive.

⁷ If the Common Name of the seed listed in the Table is not available, use seed with the listed Botanical Name.

TABLE II-2: DETAILED SEEDING ANNUALS

* Months shaded in green represent applicable planting dates.

COMMON NAME ⁵	BOTANICAL NAME	APPROVED SITE(S)	NURSE CROP RATE (lbs/acre)	TEMP COVER RATE (lbs/acre)	Planting Dates*																	
					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC						
Crimson Clover ¹	Trifolium incarnatum	ALL	20	20																		
Lespedeza¹ Kobe / Korean	Lespedeza striata /stipulacea	Shoulders / Medians, Slopes	15	60																		
Browntop Millet ²	Panicum ramosum	ALL	10	40																		
German Millet ² (Foxtail Millet)	Setaria italica	ALL	10	40																		
Japanese Millet ²	Echinochloa crusgalli	Slopes	10	50																		
Oats	Avena sativa	Slopes	40	110																		
Hairy Vetch ¹	Vicia villosa	ALL	15	50																		
Pearl Millet	Pennisetum glaucum	Slopes	15	50																		
Sudangrass	Sorghum bicolor	Buffers	20	60																		
Barley	Hordeum vulgare	Slopes	55	110																		
Wheat ⁴	Triticum spp.	Slopes	35	110																		
Rye Grain ^{3, 4}	Secale cereale	ALL	40	110																		

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

* Months shaded in green represent applicable planting dates.

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 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 is not available, use seed with the listed Botanical Name. Do not use Wild Bird, Wild Animal, or Domestic Feed Seed.

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 needed month, follow the directions 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 ⁸	Botanical Name	Planting Rate (lbs/acre)	Planting Rate (lbs/1000sf)	Planting Dates												Use Areas	Description	Habitat	Characteristics
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Pick 1 Turf-Type (Minimum)	Bahiagrass ¹	<i>Paspalum notatum</i>	30	0.7			•	•	•	•	•						ALL	Non Native Creeping Perennial Grass	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.	Warm season perennial, spreads by rhizomes, grows 1-2 feet tall, deep root system. Sandy soils, shade tolerant, salt tolerant, drought tolerant. Low maintenance, tough, coarse bladed grass surviving conditions that destroy most turf grasses. Adapts to most soil conditions and is extremely tolerant to wear and traffic.
	Common Bermudagrass ² (unhulled = hull present)	<i>Cynodon dactylon</i>	30	0.7	•	•	•						•	•	•	•	ALL	Non Native Creeping Perennial Grass	Lawns, public areas, problem soils, heavy traffic areas, water conveyance area, pH 5.0-8.0	Long-lived, warm season perennial, spreads by rhizomes/stolons seed, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement. Used for channels, pond banks, grassed waterways, and vegetated flumes.
	Common Bermudagrass ² (hulled = hull absent)	<i>Cynodon dactylon</i>	25	0.6				•	•	•	•						ALL	Non Native Creeping Perennial Grass	Lawns, public areas, problem soils, heavy traffic areas, water conveyance area, pH 5.0-8.0	Long-lived, warm season perennial, spreads by rhizomes/stolons seed, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement. Used for channels, pond banks, grassed waterways, and vegetated flumes.
	Tall Fescue (KY-31) ³	<i>Festuca arundinacea</i>	50	1.15	•	•	•	•									ALL	Non Native Tall Growing Cool-season Perennial Grass	Lawns, public areas, problem soils, heavy traffic areas, pH 5.5 - 8.0.	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.
	Carpet Grass / Centipedegrass Combo	<i>Axonopus affinis</i> <i>Eremochloa ophiuroides</i>	15 10	0.3 0.2			•	•	•	•	•	•					Non Slopes, Shoulders / Medians	Non Native Creeping Perennial Grass	Slightly acidic sandy or sandy-loam soils with available moisture, pH 5.0-6.0	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.
	Perennial Rye Grass ⁴	<i>Lolium perenne</i>	15	0.3	•	•	•	•					•	•	•	•	ALL	Naturalized Herbaceous Perennial	Medium fertility, acid, clay, and loamy soils, pH 5.2-7.5	Fast growing, short term, cool season bunch grass, grows 1-2 feet tall. Full sun, low drought tolerance, moderate salt tolerance.
	White Clover ⁵	<i>Trifolium repens</i>	5	0.1		•	•	•					•	•	•		ALL	Naturalized Herbaceous Perennial Legume	Moist soils, field borders, pH 6.0-7.5.	Grows to 1 foot tall. Full sun, low drought tolerance, low salt tolerance. Good erosion control cover.
Pick 1 Nurse Crop (Minimum)	Crimson Clover ⁵	<i>Trifolium incarnatum</i>	20	0.5	•	•	•							•	•	•	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 ⁵ Kobe / Korean	<i>Lespedeza striata</i> / <i>stipulacea</i>	15	0.3			•	•	•	•	•						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 ⁶	<i>Panicum ramosum</i>	10	0.2				•	•	•	•	•					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 ⁶ (Foxtail Millet)	<i>Setaria italica</i>	10	0.2					•	•	•	•					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
	Hairy Vetch ⁵	<i>Vicia villosa</i>	15	0.3	•	•	•	•						•	•	•	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	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
	Rye Grain ⁷	<i>Secale cereale</i>	40	0.9	•	•	•	•						•	•	•	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 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.

Slopes & Buffers

	Common Name ⁹	Botanical Name	Planting Rate (lbs/acre)	Planting Rate (lbs/1000sf)	Planting Dates												Use Areas	Description	Habitat	Characteristics		
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec						
Pick 1 Turf-Type (Minimum)	Bahiagrass ¹	<i>Paspalum notatum</i>	30	0.7			●		●	●	●						ALL	Non Native Creeping Perennial Grass	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.	Warm season perennial, spreads by rhizomes, grows 1-2 feet tall, deep root system. Sandy soils, shade tolerant, salt tolerant, drought tolerant. Low maintenance, tough, coarse bladed grass surviving conditions that destroy most turf grasses. Adapts to most soil conditions and is extremely tolerant to wear and traffic.		
	Common Bermudagrass ² (unhulled = hull present)	<i>Cynodon dactylon</i>	30	0.7	●	●	●						●	●	●	●	ALL	Non Native Creeping Perennial Grass	Lawns, public areas, problem soils, heavy traffic areas, water conveyance area, pH 5.0 - 8.0	Long-lived, warm season perennial, spreads by rhizomes/stolons seed, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement. Used for channels, pond banks, grassed waterways, and vegetated flumes.		
	Common Bermudagrass ² (hulled = hull absent)	<i>Cynodon dactylon</i>	25	0.6				●	●	●	●						ALL	Non Native Creeping Perennial Grass	Lawns, public areas, problem soils, heavy traffic areas, water conveyance area, pH 5.0 - 8.0	Long-lived, warm season perennial, spreads by rhizomes/stolons seed, grows 4-6 inches tall. High heat tolerance, salt tolerant, high nitrogen requirement. Used for channels, pond banks, grassed waterways, and vegetated flumes.		
	Tall Fescue (KY-31) ³	<i>Festuca arundinacea</i>	50	1.15	●	●	●	●							●	●	●	ALL	Non Native Tall Growing Cool-season Perennial Grass	Lawns, public areas, problem soils, heavy traffic areas, pH 5.5 - 8.0.	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.	
Pick 1	Weeping Lovegrass	<i>Eragrostis curvula</i>	5	0.1			●	●	●	●	●						Slopes	Naturalized Herbaceous Perennial	Light textured, low fertility, well drained soils, pH 4.5-8.0.	Warm season bunch grass, grows 3 feet tall. Full sun, high drought tolerance.		
	Indiangrass	<i>Sorghastrum nutans</i>	10	0.2	●	●	●	●	●	●	●						Slopes, Buffers	Native Herbaceous Perennial	Most or dry fields, roadsides and serpentine barrens.	Warm season bunch grass, grows to 6 feet tall. Full sun, moderate drought tolerance, moderate salt tolerance.		
	Little Bluestem	<i>Schizachyrium scoparium</i>	10	0.2	●	●	●	●	●	●	●				●	●	Slopes, Buffers	Native Herbaceous Perennial	Meadows, roadsides, slopes, grows in a wide variety of soils including infertile soils. pH 5.5 to 8.5 pH, refers 7.0 and slightly higher.	Tall warm-season Native perennial grass - 2 to 4 ft height. Bunch type grass, rhizomatous grass. Excellent drought tolerance, poor flood tolerance and some shade tolerance. Good erosion control.		
	Coastal Panicgrass	<i>Panicum amarum</i>	20	0.5		●	●	●	●	●	●						Slopes, Buffers	Native Herbaceous Perennial	Sandy shores, alluvium, fields and banks, pH 5.0 - 8.0	Warm season bunch grass, deep root system, grows 3-6 feet tall. Full sun, high drought tolerance, moderate salt tolerance.		
	Switchgrass	<i>Panicum virgatum</i>	10	0.2	●	●	●	●	●	●	●					●	Slopes, Buffers	Native Herbaceous Perennial	Variety of soils and temperatures, tolerant of moisture extremes, refuge for animals. Soil pH 5.0 or above.	Tall warm-season Native perennial grass - 2 to 6 ft height. Used in naturalized plantings, great for erosion control. Eco-friendly - requires little if any chemical fertilization.		
	Perennial Rye Grass ⁴	<i>Lolium perenne</i>	15	0.3	●	●	●	●						●	●	●	●	ALL	Naturalized Herbaceous Perennial	Medium fertility, acid, clay, and loamy soils, pH 5.2-7.5	Fast growing, short term, cool season bunch grass, grows 1-2 feet tall. Full sun, low drought tolerance, moderate salt tolerance.	
	Virginia Wildrye	<i>Elymus virginicus</i>	10	0.2		●	●								●	●	●	Slopes, Buffers	Native Herbaceous Perennial	Moist woods, meadows, and riverbanks, pH 5.0 - 7.4	Short-lived, cool season bunch grass, grows 3-6 feet tall. Shade tolerant, moderate drought tolerance, no salt tolerance.	
Pick 1	White Clover ⁵	<i>Trifolium repens</i>	5	0.1		●	●	●						●	●	●	●	ALL	Naturalized Herbaceous Perennial Legume	Moist soils, field borders, pH 6.0-7.5.	Grows to 1 foot tall. Full sun, low drought tolerance, low salt tolerance. Good erosion control cover.	
	Crownvetch ⁵	<i>Coronilla varia</i>	25	0.6	●	●	●	●							●	●	●	Slopes, Buffers	Naturalized Herbaceous Perennial Legume	Tolerant of low pH and low fertility	Low-growing vine with a creeping stem that grows to less than 2 feet. Prefers full sun, but will grow in sparse shade. Grows in rocky dry sites as well as moist areas with good drainage, clay and shallow soils.	
	Sericea Lespedeza ⁶ (Scarified seed)	<i>Lespedeza cuneata</i>	50	1.15				●	●	●	●						Slopes	Naturalized Herbaceous Perennial Legume	Deep, well-drained, medium to coarse textured soils. Tolerant of low pH (4.5) and infertile soils. Optimum pH range is 6.0-6.5.	Cool-season perennial legume grows 2 to 4 feet. Can be invasive. Widely branched that penetrate soil more than 3 feet.		
	Sericea Lespedeza ⁶ (Unscarified seed)	<i>Lespedeza cuneata</i>	80	1.8	●	●	●							●	●	●	●	Slopes	Naturalized Herbaceous Perennial Legume	Deep, well-drained, medium to coarse textured soils. Tolerant of low pH (4.5) and infertile soils. Optimum pH range is 6.0-6.5.	Cool-season perennial legume grows 2 to 4 feet. Can be invasive. Widely branched that penetrate soil more than 3 feet.	
Pick 2 Nurse Crop (Minimum)	Crimson Clover ⁵	<i>Trifolium incarnatum</i>	20	0.5	●	●	●							●	●	●	●	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 ⁵ Kobe / Korean	<i>Lespedeza striata / stipulacea</i>	15	0.3			●	●	●	●	●						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 ⁷	<i>Panicum ramosum</i>	10	0.2			●	●	●	●	●						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 ⁷ (Foxtail Millet)	<i>Setaria italica</i>	10	0.2					●	●	●	●					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		
	Oats	<i>Avena sativa</i>	40	0.9										●	●	●	●	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 ⁵	<i>Vicia villosa</i>	15	0.3	●	●	●	●							●	●	●	●	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	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
	Sudangrass	<i>Sorghum bicolor</i>	20	0.5				●	●	●	●	●						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.	
	Wheat ⁸	<i>Triticum spp.</i>	35	0.8	●	●	●	●							●	●	●	●	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 ⁸	<i>Secale cereale</i>	40	0.9	●	●	●								●	●	●	●	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 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 Use Sericea Lespedeza on Slopes where other species will not adequately thrive.

⁷ Mow Millet (no lower than 3 inches) once it reaches a height of 18 inches to reduce competitiveness with permanent vegetation.

⁸ 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.

⁹ If the Common Name of the seed listed in the Tables is not available, use seed with the listed Botanical

Annuals

COMMON NAME ⁵	BOTANICAL NAME	APPROVED SITE(S)	NURSE CROP RATE (lbs/acre)	TEMP COVER RATE (lbs/acre)	Planting Dates ⁶												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	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
Pearl Millet	<i>Pennisetum glaucum</i>	Slopes	15	50				●	●	●	●	●						Slopes	Tall warm season annual grass	Adapts to coarse and medium textured soils, pH 5.5-6.8. 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 III

STABILIZATION CHECKLIST

GREENVILLE COUNTY STABILIZATION CHECKLIST

PROJECT NUMBER: _____ PROJECT NAME: _____

Total Area of Application (acres): _____

Application Area(s): Flat Areas Slopes / Buffers Shoulders / Medians

Application: Permanent Cover Temp. Cover by Seeding Temp. Cover by Mulch

Has a seeding plan been sent to and approved by the ENGINEER? YES NO

Has a soil analysis been conducted (if YES, attach a copy to this form)? YES NO

Has a certified copy of the soil analysis been submitted to the ENGINEER? YES NO

Has the seedbed been properly prepared for application? YES NO

Is seed individually packaged, bagged and tagged, clearly stating all requirements? YES NO NA

Substitution: YES NO NA

If acceptable seeds are not available and the most practicable alternative seed is substituted then the Contractor must submit data to the ENGINEER showing that the substitute seed is appropriate for the specific application.

PERMANENT COVER: <input type="checkbox"/> complete entire chart		Y E S	N O	APPLIED TOTAL	APPLIED RATE ¹	RECOMMENDED RATE
TEMP COVER BY SEEDING: <input type="checkbox"/> complete shaded items only						
SEED TYPES:				lbs	lb/acre	lb/acre
				lbs	lb/acre	lb/acre
				lbs	lb/acre	lb/acre
				lbs	lb/acre	lb/acre
				lbs	lb/acre	lb/acre
				lbs	lb/acre	lb/acre
				lbs	lb/acre	lb/acre
FAST ACTING LIME <input type="checkbox"/> LIQUID <input type="checkbox"/> DRY				lbs or gal	lbs or gal/acre	lbs or gal/acre
AG GRANULAR LIME (from soil analysis)				lbs	lb/acre	lb/acre
BIOLOGICAL GROWTH STIMULANT				gal	gal/acre	gal/acre
SLOW RELEASE NITROGEN (N) (from soil analysis) ²				lbs	lb/acre	lb/acre
PHOSPHORUS (P ₂ O ₅) (from soil analysis) ³				lbs	lb/acre	lb/acre
POTASSIUM (K ₂ O) (from soil analysis) ⁴				lbs	lb/acre	lb/acre
MULCH TYPE ¹ :				lbs	lb/acre	lb/acre
MULCH APPLIED AT RECOMMENDED RATE ¹				N/A	N/A	N/A
EROSION CONTROL BLANKET (ECB)				ft ²	N/A	N/A
TURF REINFORCEMENT MAT (TRM)				ft ²	N/A	N/A
WOOD CHIPS OR COMPOST				cy	cy/acre	cy/acre

¹ Applied Rate = Applied Total / 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 (P₂O₅)/bag _____ = total applied weight (lbs) of (P₂O₅) _____

⁴ bag wt.(lbs) _____ x # bags _____ x % Potassium (K₂O)/bag _____ = total applied weight (lbs) of (K₂O) _____

MULCH APPLICATION TABLE

Mulch	Applicable Slopes (H:V) ¹	Minimum Application Rate (lbs/acre -dry) ²
Wood Chips	≤ 4:1	500 CY/acre
Straw or Hay with Tackifier	≤ 4:1	2,000
HECP Type 1	≤ 4:1	2,000
HECP Type 2	4:1 < S ≤ 3:1	2,500
HECP Type 3	3:1 < S ≤ 2:1	3,000
HECP Type 4	2:1 < S ≤ 1:1	3,500
	>1:1	4,000 (temp cover only) ³
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.

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.