

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
CRITICAL AREA PLANTING

(Ac.)

CODE 342

DEFINITION

Establishing permanent vegetation on sites that have, or are expected to have, high erosion rates, and on sites that have physical, chemical, or biological conditions that prevent the establishment of vegetation with normal practices.

PURPOSE

This practice may be applied for one or more of the following purposes:

1. To stabilize areas with existing or expected high rates of soil erosion by wind or water;
2. To stabilize stream and channel banks, ponds, and other shorelines;
3. To stabilize coastal areas, such as sand dunes, and riparian areas.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses with existing or expected high rates of erosion, or highly disturbed sites that usually cannot be stabilized by ordinary conservation treatment and/or management.

Examples of applicable areas include construction areas, conservation structures, filter strips, embankments, cuts, fills, mined areas, roadsides, landfills, spoilbanks, eroded banks of natural channels, banks of newly constructed channels, recreation areas, and other areas degraded by human activities or natural events.

CRITERIA

General Criteria Applicable to All Purposes

Grading Plan. The grading plan and practice installation shall be based upon adequate topographic surveys and investigations. The plan shall show the location, slope, cut, fill, and finish elevation of the surfaces to be graded. The plan shall also include auxiliary practices for safe disposal of runoff water, slope stabilization, erosion control, and drainage. Practices such as waterways, ditches, diversions, grade stabilization structures, retaining walls, and subsurface drains shall be included where necessary.

Site Preparation. Timber, logs, brush, rocks, stumps, and vegetative matter that will interfere with the grading operation or affect the planned stability of fill areas shall be removed and disposed of according to the plan.

Strip and stockpile topsoil in amounts necessary to complete finish grading of all exposed areas requiring topsoil.

Fill material shall be free of brush, rubbish, timber, logs, stumps, and other vegetative matter in amounts that is detrimental to constructing stable fills.

All disturbed areas shall be left with a generally smooth finish and shall be protected from erosion.

Include provisions to safely conduct surface water to storm drains or suitable watercourses and to prevent surface runoff from damaging cut faces and fill slopes. In areas having a high water table, provide subsurface drainage to intercept

seepage that would adversely affect slope stability, building foundations, or create undesirable wetness.

Protect adjoining properties from sedimentation associated with excavation and filling operations.

Do not place fill material adjacent to the bank of a stream or channel, unless provisions are made to protect the hydraulic, biological, aesthetic, and other environmental functions of the stream.

Plant Materials. Select plant species based on their adaptability to the environmental conditions present and to the planned land use. Herbaceous and/or woody plants (available as seed, sprigs, cuttings, bare-root seedlings, containerized stock, or balled-and-burlapped stock) may be appropriate. For best results, use species and varieties with proven conservation traits.

Species shall be selected based on:

1. Climatic conditions, such as annual and seasonal rainfall, growing season length, humidity, and USDA Plant Hardiness Zones (see Figure 1);
2. Soil and site conditions such as drainage class, pH, available water holding capacity, slope, aspect, shade, inherent fertility, salinity or alkalinity, flooding or ponding, and levels of toxic elements such as aluminum and heavy metals;
3. Plant characteristics, such as:
 - a. Ease of establishment, persistence, and time needed for full stand establishment;
 - b. Growth habit (e.g., sod or bunch) as it relates to surface cover;
 - c. Rooting depth and spread as it relates to slope stability;
 - d. Resistance to dislodgment by flowing water or wave action at various velocities and depths;
 - e. Season of growth (warm or cool) and life cycle (annual, perennial, or biennial);

f. Fertility and management requirements;

g. Visual appeal.

Plant materials shall either be native to Delaware, or introduced and non-invasive (i.e., not likely to spread beyond the planted area and displace native species). Selection of native species shall be a priority when feasible. No plant listed by the state of Delaware as an invasive species shall be established in the critical area planting.

Site preparation and planting to establish vegetative cover shall be done at a time and manner to insure survival and growth of selected species. Provide supplemental moisture if and when necessary to assure early survival and establishment of selected species.

Only viable, high quality seed and planting stock shall be used. The method of planting shall include hand or machine planting techniques, suited to achieving proper depths and placement for the selected plant species.

Protect the planting from unacceptable impacts due to pests, wildlife, livestock, or wildfire. Exclude livestock as needed to establish the planting.

Noxious weeds shall be controlled as required by state law.

Soil Amendments. Use soil tests to determine the optimum recommendations for both lime and fertilizer. Soil analysis shall be performed by a soil testing laboratory that has been accredited by the North American Proficiency Testing Program, preferably the University of Delaware Soil Testing Laboratory. At a minimum, soil samples taken for nutrient and pH analysis shall be from the soil layer that will be used as the surface layer (top 4 to 6 inches) for seeding. Follow sampling procedures recommended by the laboratory.

Lime - Apply lime to achieve a soil pH of 6.0 if legumes will be included in a planting, and 5.5 if only grasses or woody plants will be used. Lime materials shall be ground agricultural limestone that contains at least 50% total oxides (calcium plus magnesium oxide). Hydrated lime may be substituted for agricultural lime, except in

hydroseeding applications. Do not use burnt lime as a soil amendment.

Pulverized limestone shall be ground to such fineness that at least 50% will pass through a 100-mesh sieve and at least 98% will pass through a 20-mesh sieve. Apply pulverized limestone with a drop spreader when high winds will not interfere with uniform distribution of the material or cause nuisance dust. Pulverized limestone may also be used in a hydroseeding slurry.

Granular limestone shall be of such fineness that at least 30% will pass through a 100-mesh sieve, at least 50% through a 60-mesh sieve, and at least 98% through a 20-mesh sieve. Apply granular limestone with a drop or rotary spreader, but do not use it in a hydroseeding slurry.

Pelletized limestone, a product composed of pellets of pulverized limestone, shall be of a pellet type and size that is recommended by the manufacturer for use with turfgrass. The limestone used in the manufacture of the pelletized limestone product shall meet the minimum fineness requirements for pulverized limestone. Apply pelletized limestone with a drop or rotary spreader, or it may be used in a hydroseeding slurry.

When a soil test is not feasible, apply lime according to the rates specified as follows:

Table 1: Limestone Application Rates.

Soil Texture	Maximum Rates for Limestone Application	
	Tons/Acre	Lbs/1,000 SF
Clay, clay loam, and highly organic soil	3	135
Sandy loam, loam, silt loam	2	90
Loamy sand, sand	1	45

Limestone applied at rates greater than 50 pounds per 1,000 square feet (or greater than 1 ton per acre) shall be incorporated into the upper 4 to 6 inches of the soil. Limestone applied at lower

rates may be incorporated or left on the soil surface.

Fertilizer - The use of commercial fertilizer and other forms of plant nutrients must be in compliance with Delaware nutrient management regulations, as applicable. Apply fertilizer to prepared seedbeds, as needed based on soil test results. Fertilizer applied without a soil test may result in an inefficient quantity of nutrients for plant establishment, or could result in overapplication of nutrients leading to potential water quality problems and excessive weed growth. However in circumstances when a site is likely to have low nutrient levels (e.g., on a construction site) and obtaining a soil test is not feasible, use the rates in Table 2 for starter fertilizer applications for grass-based plantings:

Table 2: Starter Fertilizer Application Rates for Grass-based Plantings.

Species	Maximum Rates for Starter Fertilizer Application		
	N	P ₂ O ₅	K ₂ O
Cool-Season Grass (CSG)	45 Lbs/Ac (1 Lb/ 1,000 SF)	90 Lbs/Ac (2 Lbs/ 1,000 SF)	90 Lbs/Ac (2 Lbs/ 1,000 SF)
CSG + Legumes	22 Lbs /Ac (0.5 Lb/ 1,000 SF)	90 Lbs/Ac (2 Lbs/ 1,000 SF)	90 Lbs/Ac (2 Lbs/ 1,000 SF)
Warm-Season Grass (WSG) or WSG/CSG Mixes	None	45 Lbs/Ac (1 Lb/ 1,000 SF)	45 Lbs/Ac (1 Lb/ 1,000 SF)
WSG/CSG Mixes + Legumes	None	45 Lbs/Ac (1 Lb/ 1,000 SF)	45 Lbs/Ac (1 Lb/ 1,000 SF)

Starter fertilizer shall be applied at the time of seeding or up to 5 days after seeding. Unless otherwise specified by NRCS, 20-50% of total nitrogen shall be slow-release to provide nitrogen over a longer period of time and to reduce nitrogen leaching and runoff. Nitrogen is generally not recommended for use during the establishment of warm-season grass because it encourages increased weed competition.

All fertilizer shall be uniform in composition, free-flowing, and suitable for application by approved equipment. Fertilizers shall be delivered to the site fully labeled according to applicable state fertilizer laws and shall bear the name, trade name, or trademark and warranty of the producer.

Organic Amendments - Apply manure and compost at a rate based on a nutrient analysis of that material. Organic amendments to sites shall be recommended only after an evaluation of any potential water quality hazards. To the extent practical, incorporate organic amendments into the upper 4 to 6 inches of the soil with a disk, springtooth harrow, or other suitable equipment.

Topsoil. Topsoil shall be added to a site when needed to improve the soil medium for plant establishment and growth, or when a sufficient amount was not available to stockpile. The use of topsoil shall be limited to slopes that are 2:1 or flatter.

Exposed soils shall be topsoiled if they have one or more of the following limiting factors:

1. Very shallow to bedrock or other restrictive layer (e.g., the subsoil is less than 6 inches deep);
2. Extremely acidic (pH less than 5.0); or,
3. Extremely salty (conductivity greater than 500 parts per million, or 4.0 millisiemens per centimeter).

Topsoil shall also be used when assurance of improved vegetative growth is desired.

Topsoil Quality - Topsoil shall be friable and loamy, free of debris, stones, or other materials larger than 1.5 inches in diameter. It shall be free of any known viable seeds or plant parts of noxious weeds or invasive plants.

Topsoil shall contain no toxic substance that may be harmful to plant growth. Soluble salts shall not be excessive (concentration greater than 500 parts per million). A pH range of 5.5 to 7.5 is required. If pH is less than 5.5, lime shall be applied and incorporated with the topsoil to achieve a soil pH of 6.0 if legumes will be

included in a planting, and 5.5 if only grasses or woody plants will be used. Topsoil hauled in from off-site shall have a minimum organic matter content of 1% by weight, based on soil test results.

Topsoil Application - Before topsoiling, test the pH of the exposed subsoil. If the subsoil is highly acidic, add ground agricultural limestone at the rate of 4 to 8 tons per acre (200 to 400 pounds per 1,000 square feet). Distribute the lime uniformly, and work it into the subsoil as previously described in the section concerning Soil Amendments.

Immediately before spreading topsoil, the subsoil shall be loosened by disking or scarifying to provide a good bond for the topsoil. Where the slope of the site is flatter than 3:1, loosen the subsoil to a minimum average depth of 2 inches. On steeper slopes (up to 2:1), loosen the subsoil to a depth of 0.5 to 1 inch, or use a bulldozer to track up and down slope to create horizontal check slots that will prevent topsoil from sliding down the slope.

Topsoil shall only be handled when it is dry enough to work (less than field capacity) without damaging soil structure. Do not spread topsoil when it is partly frozen or muddy or on frozen slopes covered with ice or snow.

Topsoil shall be uniformly applied and lightly compacted to a minimum thickness of 4 inches. Subsoil with a pH of 4.0 or less, or containing iron sulfide, shall be covered with a minimum depth of 12 inches of topsoil.

Topsoil placed on slopes greater than 5% shall be promptly limed and fertilized (if needed), seeded, mulched, and tracked with suitable equipment.

Seedbed Preparation. Seedbed preparation shall be done when the soil is moist, but not wet. Apply lime, fertilizer, and other soil amendments evenly where needed on the site, as described in previous sections of this standard. Either dry or wet application methods may be suitable.

Slopes Flatter Than 3:1 - Seedbed preparation shall consist of working the soil to a depth of 3 to 5 inches with a disk or similar equipment.

Continue tillage until a reasonably uniform seedbed is prepared.

Slopes 3:1 or Steeper - Scarify the soil surface with a bulldozer, heavy chain, hand tools, or other equipment that will loosen the soil 0.5 to 1 inch deep. After the soil is loosened, do not work it completely smooth, but leave it in a somewhat roughened condition. Follow the general contour when making the final surface preparation.

Seed Quality and Treatment. All seed shall be labeled and meet the requirements of the Delaware Seed Law. Refer to Table 7 for minimum germination and purity requirements. Seed shall have had a germination test within 12 months prior to the date of sowing. Use of certified seed is preferred. Keep seed cool and dry until planting.

Species with seed lots greater than 50% hard seed shall be dehulled and/or scarified and planted no later than 60 days after scarification.

Grasses that have fluffy seeds shall be planted using specially designed native seed drills. Alternatively, mechanically remove beards or awns from such seeds to facilitate movement through conventional seeding equipment.

Legume seeds shall be inoculated with the proper, viable *Rhizobium* bacteria before planting. Keep inoculant as cool as possible until use and do not use it later than the date indicated on the package. When hydroseeding, use four times the recommended inoculant rate.

Seeding Methods. Seed shall be applied uniformly by hand, cyclone seeder, drill, cultipacker-seeder, or hydroseeder. The preferred method of seeding is by drilling or cultipacker-seeder method because these methods optimize seed to soil contact.

Seeding operations shall be done on the contour to the extent feasible. When a uniform distribution of seed is especially important (e.g., on lawns and athletic fields) and slopes are not extremely steep, apply seed in two directions, each perpendicular to one another. Apply one-half the seeding rate in each direction.

Drill - Seed shall be planted by using a grass drill or cultipacker-type seeder. A grain drill may also

be used if it can be calibrated to plant small seeds at the recommended planting rates. As previously noted, plant grasses with fluffy seeds by using a specially designed native seed drill. All drills shall have packer wheels, chains, or similar devices to close the seed slot and provide good seed to soil contact. Do not plant small-seeded grasses more than 1/4 to 1/2-inch deep.

Broadcast - Seed may be broadcast by using a cyclone or whirlwind seeder or by hand. If spread by hand, small or light-seeded species such as redtop or bluestem may be mixed with filler (e.g., sawdust, finely ground corn, or slightly moistened peat moss) to achieve an even distribution. Incorporate seed into the soil 1/8 to 1/4-inch deep by raking or dragging, cultipacking, or tracking with heavy machinery. Raked areas shall be rolled with a weighted roller to provide good seed to soil contact. Do not use broadcast seeding methods during windy conditions.

Hydroseeding - This method is best suited for steep, inaccessible areas where use of a drill or other mechanized equipment is not feasible. Hydroseeding shall be done in two separate operations with seed and fertilizer applied in the first pass and mulch applied in the second pass. Do not use burnt or hydrated lime when hydroseeding. If legume inoculant is used, complete the seeding within 3 to 4 hours after slurry is mixed or add a fresh supply of inoculant to the mix. If feasible after seeding, track the area up and down slope with heavy machinery such as a bulldozer to improve seed to soil contact.

Temporary Seeding and Nurse Crops. When the period of soil exposure is more than two months but less than twelve months, a temporary seeding (usually an annual grass) shall be used to provide short-term cover on disturbed areas. See Table 3 for recommended plant species and planting rates.

Temporary seedings shall be planted as a nurse crop with a permanent seeding mixture when rapidly growing cover is needed. When seeding toward the end of the listed planting dates for permanent seedings, or when conditions are expected to be less than optimal, select an appropriate nurse crop from Table 3 and plant with the permanent seeding mix. Companion seedings of small-seeded grasses shall not exceed

5% (by weight) of the overall permanent seeding mixture. Companion seedings of small grains such as barley, wheat, or oats shall be sown at one-third the rates listed in Table 3. Cereal rye generally should not be used as a nurse crop unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants.

Oats are the recommended nurse crop for warm-season grasses.

When a temporary or permanent seeding cannot be completed because of weather conditions or time of year, apply mulch only (no seeding) as a temporary cover when soil stabilization is needed. Refer to the conservation practice standard Mulching (484) for materials, application rates, and methods.

Permanent Seeding. Permanent herbaceous vegetation shall be designed to achieve a minimum stand density of 85 percent ground cover within one year.

Seed Mixes - To establish permanent cover, select grass and legume mixes according to the guidelines listed in Tables 3 and 4.

Planting Dates - Use Figure 1 and Table 4 to determine the recommended planting dates for selected mixes.

Supplemental Watering - If soil moisture is deficient, supply new seedings with adequate water (a minimum of 1/4-inch twice a day) until vegetation is well established. This is especially necessary when seeding is performed in abnormally dry or hot weather or on droughty soils.

Mulching. Mulch shall consist of natural and/or artificial non-toxic materials of sufficient thickness and durability to achieve the intended effect for the required time period. Methods of anchoring mulch shall be sufficiently durable to maintain mulch in place until it is no longer needed.

Mulching is required for critical area plantings on structural measures (e.g., grassed waterways, diversions, embankments, etc.), and shall be

applied elsewhere as needed. Refer to the conservation practice standard Mulching (484) for materials, application rates, and methods.

Sod. Commonly available sod types include Kentucky Bluegrass blends and Tall Fescue/Kentucky Bluegrass mixes.

Sod Quality and Treatment - Sod shall be state certified sod that is at least one year old but not older than 3 years. Sod shall be machine cut to uniform thickness of 3/4-inch, plus or minus 1/4-inch, at the time of cutting. Measurement of thickness shall exclude top growth or thatch.

Standard size sections of sod shall be strong enough to support their own weight and retain their shape when suspended vertically with a firm grasp of the upper 10% of the section.

Individual pieces of sod shall be cut to the supplier's width and length. Maximum allowable deviation from standard widths and lengths shall be no more than 5%.

Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be inspected and approved prior to its installation.

Do not harvest or transplant sod when the moisture content (excessively wet or dry) may adversely affect its survival.

Planting Dates - Use Figure 1 and Table 4 to determine the appropriate planting dates for sod.

The optimum planting period is in early fall, followed by the spring planting period. Sod may be planted during the summer if supplemental watering will be provided until the sod is well established. The fall planting season is limited by the amount of time the sod has to develop roots before the ground freezes. Newly sodded areas usually need 4 to 6 weeks before the sod is sufficiently rooted. Similarly, the spring planting season is limited by the high temperatures and drought of summer, unless supplemental water will be provided.

Installation - Prior to sodding, the soil surface shall be cleared of roots, brush, trash, debris, and other objects that would interfere with planting.

Based on a soil test, apply lime and fertilizer as needed, and mix into the top 3 inches of soil. Rake the site smooth in preparation for laying the sod.

During periods of high temperature, lightly water the soil surface immediately before laying the sod. Lay sod strips lengthwise on the contour, never up and down the slope, starting at the bottom of the slope and working up. On steep slopes, use ladders to facilitate the work and prevent damage to the sod.

Lay sod strips in staggered rows, with joints butted tightly together to prevent voids. Roll or tamp the sod immediately following placement to insure solid contact of root mat and soil surface. Do not overlap the sod strips.

On slopes greater than 3:1, secure sod to the soil surface with wooden pegs or wire staples.

Where surface water cannot be diverted from flowing over the face of a sodded slope, install a capping strip of heavy jute or plastic netting, properly secured, along the crown of the slope and edges to provide extra protection against lifting and undercutting of sod. Use the same technique to anchor sod in water-carrying channels and other critical areas. Use wire staples to anchor netting in channel work.

Supplemental Watering - Immediately following installation, water the sod until moisture penetrates the soil layer beneath the sod to a depth of 4 inches. Maintain optimum moisture for at least 2 weeks by lightly watering the sod on a regular (usually daily) basis, unless sufficient rainfall has occurred. Do not allow the sod to dry out completely. After the sod begins to take root, reduce the frequency of watering and increase the amount of water applied per watering. This encourages the development of a deep root system and ultimately reduces the amount of water needed.

Groundcovers. On sites where grass is difficult to grow or maintain, other perennial groundcovers may be used to control erosion. Groundcovers are low-growing herbaceous plants, vines, and creeping shrubs that spread quickly to form a dense cover. These plants should not be expected to provide erosion control or prevent soil slippage on sites that are

inherently unstable due to soil texture, structure, water movement, or excessive slope.

Selection of Plant Species - Low-maintenance groundcovers are available to suit a variety of conditions, especially for small areas around homes and commercial buildings. These plants generally require more care than turf during the initial establishment period but may require less care after establishment.

Species recommendations may be found by consulting publications in the References section of this standard. Be cautious of using species that have aggressive growth habits and may spread beyond the planted area, especially if the planting is near a neighboring property or a natural area such as a shoreline or woodland. Species such as English Ivy (*Hedera helix*) and Periwinkle (*Vinca minor*) tend to grow rapidly once established, and should not be used except under well-contained conditions.

Planting Dates - Use Figure 1 and Table 4 to determine the appropriate planting dates for the different types of plant materials.

Installation - Prepare the soil by incorporating 2 inches of compost into the upper 8 inches of soil. If needed based on a soil test, incorporate lime and fertilizer into the soil.

Install the plants at a spacing that is based on their present size, expected rate of growth and size at maturity, and how quickly complete coverage is desired. In general, use a spacing of one plant for every 1 to 4 square feet and stagger the spacing of plants between rows.

Cover the entire planted slope with a mulch that will provide sufficient erosion control during the establishment period. Refer to the conservation practice standard Mulching (484) for materials, application rates, and methods.

Trees and Shrubs. If trees and shrubs will be used on a critical area, the soil surface shall be stabilized with mulch or with a low-growing herbaceous planting (e.g., creeping red fescue) to control erosion until the woody plants are large enough to serve that purpose.

Refer to the conservation practice standard for Tree/Shrub Establishment (612) for a selected list

of native tree and shrub species that may be used. Other trees and shrubs that are native to Delaware, or are introduced and are non-invasive (i.e., not likely to spread beyond the planted area and displace native species), may also be suitable. Follow the establishment recommendations in the Delaware Fact Sheet for Trees and Shrubs.

For selection and use of trees and shrubs as part of a soil bioengineering system for upland slopes, refer to Chapter 18 of the Engineering Field Handbook.

Additional Criteria to Stabilize Stream and Channel Banks, Ponds, and Other Shorelines

When slopes are modified, stockpile topsoil and spread over areas to be planted as needed to meet planting and landscaping needs.

Bank and Channel Slopes. Channel side slopes shall be shaped so that they are stable and allow establishment and maintenance of desired vegetation. Slopes steeper than 2:1 shall not be stabilized using vegetation alone. Use a combination of vegetative and structural measures on these slopes to ensure adequate stability.

Species Selection. Plant materials used for this purpose shall:

1. Be adapted to the hydrologic zone into which they will be planted;
2. Be adapted and proven in the regions in which they will be used;
3. When mature, result in plant communities that are compatible with those in the area;
4. Protect the channel banks but not restrict channel capacity.

Establishment of Vegetation. The species used, planting rates, spacing, and methods and dates of planting shall be based on plant materials program trials or other technical guidance, such as local planting guides or technical notes. When flow velocities, soils, and bank stability preclude stabilization by vegetative establishment alone,

utilize a combination of vegetative and structural practices including living and inert material.

Identify and protect desirable existing vegetation during practice installation. If the existing vegetation on a site will compete with species to be established, it shall be controlled in a manner that ensures the successful establishment of the planted species.

Streambank stabilization plantings shall be established in accordance with the NRCS Engineering Field Handbook Part 650, Chapter 16, *Streambank and Shoreline Protection*, and Chapter 18, *Soil Bioengineering for Upland Slope Protection & Erosion Reduction*. Restrict access to planted areas until fully established.

Additional Criteria to Restore Coastal Areas, such as Sand Dunes and Riparian Areas

Plants selected for revegetating sand dunes and coastal sites must be able to survive being buried by blowing sand, sand blasting, salt spray, salt water flooding, drought, heat, and low nutrient supply.

Where applicable, sand trapping devices such as sand fences or brush matting shall be included in the revegetation/stabilization plans.

Note: Specific programs may dictate criteria in addition to, or more restrictive than, those specified in this standard.

CONSIDERATIONS

Assess site conditions including surrounding land uses, soils, available moisture during the growing season, and existing vegetation on the site and in adjacent areas, including any noxious weeds that may be present.

Consider the need for structural practices, in addition to this vegetative practice, to stabilize a critically eroding site.

Consider the time of year for installation of this practice. Avoid periods of high runoff velocities or temporarily divert runoff from the planted area. This will allow the vegetation to become well established before it is subjected to storm flows.

Consider plant species or mixes that have multiple benefits, such as for wildlife habitat and visual quality. Consider the use of native species appropriate for the site. To benefit pollinators and other wildlife, a diverse mixture of flowering shrubs and wildflowers with good soil holding capacity should be considered for inclusion as a small percentage of a larger grass-dominated planting. Species diversity should also be considered to avoid loss of function due to species-specific pests.

When selecting rooted plant materials, consider using younger planting stock because younger plants generally adapt more readily to new conditions than older plants.

Consider the long-term maintenance requirements of the established vegetation.

This practice has the potential to affect National Register listed cultural resources or eligible (significant) cultural resources. These may include archeological, historic, or traditional cultural properties. Care should be taken to avoid adverse impacts to these resources. Follow NRCS state policy for considering cultural resources during planning.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared in accordance with the previously listed criteria. Plans and specifications shall contain sufficient detail concerning site preparation and establishment to ensure successful management of the practice and may be recorded in narrative form, on Implementation Requirements (IR) worksheets, engineering designs and specifications, or on other approved forms.

Follow the establishment recommendations in the Delaware fact sheets for cool-season grasses, warm-season grasses, and trees and shrubs, as appropriate, and complete the 342 IR worksheet. The appropriate fact sheet(s) and IR worksheet can serve as the planting plan and specifications for the practice.

The following items shall be addressed, as appropriate:

1. Method of site preparation;

2. Topsoil requirements;
3. Rate and type of soil amendments to be applied;
4. Method of seedbed/planting area preparation;
5. Species and rates to be seeded/planted;
6. Method of seeding/planting;
7. Seeding/planting dates;
8. Rate and type of mulch and anchoring methods;
9. Protection of plantings.

OPERATION AND MAINTENANCE

An Operation and Management (O&M) plan shall be prepared and is the responsibility of the client to implement. The appropriate fact sheet(s) and IR worksheet may serve as the management plan, as well as supporting documentation, and shall be reviewed with and provided to the client.

At a minimum, the following components shall be addressed in the O&M plan, as applicable:

1. For seeded areas, evaluate the site within several months of seeding. If the stand is uniform but too thin (50 to 80% ground cover), plant additional seed during the next optimum seeding period. Apply seed at one-half the original rate with a no-till drill, grain drill, or hydro-seeder as site conditions dictate. Sites with an establishment rate of less than fifty percent (50%) should be reseeded in accordance with the original planting plan. Determine the reasons for planting failure and incorporate corrective measures into the remedial planting;
2. If soil moisture becomes critically deficient, irrigate the site if feasible;
3. For sodded areas, water sod as needed for the first 30 days after placement;
4. Inspect the planting at least twice during the establishment year, then at least annually thereafter. Shape and replant areas damaged

by heavy rainfall, animals, chemicals, tillage, or equipment traffic, and any other areas where the vegetation is not adequate;

5. Check for insects and diseases, and if an incidence threatens stand survival, take corrective action to keep the pest under control;
6. Control undesirable plants by pulling, mowing, or spraying with a selective herbicide. Control noxious weeds as required by state law;
7. Protect the planting from wildfire and damage from livestock, wildlife, and equipment, to the extent feasible;
8. Where wildlife habitat is a concern, do not mow during the primary nesting season (April 15 to August 15);
9. Remove temporary diversions, silt fences, etc. after the area is stabilized;
10. Apply soil amendments periodically, based on soil test results, if needed to maintain ground cover density at the desired level (usually 90% or greater). At a minimum, test the soil at least once every five years, or more often if indicated by periodic inspections of the site. If woody plants are included in the planting, do not fertilize in the first year because the plants will develop too much top growth compared to the roots. If nutrients are applied, refer to the conservation practice standard for Nutrient Management (590);
11. Describe the acceptable uses (e.g., flash grazing, haying, etc.) and time of year or frequency of use restrictions, if any. *Pay particular attention to program requirements as they relate to acceptable vs. restricted uses and other management restrictions.*

SUPPORTING DATA AND DOCUMENTATION

The following is a list of the minimum data and documentation to be recorded in the case file:

1. Extent of planting in acres, field number where the practice is located, and the location of the practice marked on the conservation plan map;
2. Assistance notes. The notes shall include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom;
3. Copy of the appropriate fact sheet(s) and completed IR worksheet, or other specifications and management plans.

Additional Documentation for Construction Check Data/As-Built

In addition to the general requirements listed above, the following is a list of minimum documentation to be included in the case file when Critical Area Planting (342) is used to specify the planting component of structural practices:

1. Document inspection date(s), name of the person who performed the inspection(s), specifics as to what was inspected, alternatives and adjustments discussed, decisions made, and by whom;
2. Dimensions of the stabilized area;
3. Certification statement on seeding and planting;
4. Final quantities and documentation for any quantity changes. Include materials certification when requested;
5. Sign and date check notes and plans to include the statement that the practice meets or exceeds the requirements of the NRCS conservation practice standard.

REFERENCES

1. Barton, Susan. November, 2012. *Fertilizer Basics*. Fact Sheet NPS-2. Delaware Cooperative Extension, University of Delaware.
2. Barton, Susan. April, 2013. *Livable Lawns: Managing a Healthy Lawn*. Delaware Cooperative Extension, University of Delaware.
3. Delaware Cooperative Extension, University of Delaware. January, 2013. *Turfgrass Selections for Delaware*.
4. Delaware Department of Natural Resources and Environmental Control. *The Flora of Delaware Online Database*.
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FIGURE 1: USDA Plant Hardiness Zones for Delaware



TABLE 3: Temporary Seeding for Site Stabilization

Plant Species	Seeding Rate ^{1/}		Seeding Depth (inches) ^{2/}	Recommended Seeding Dates by Plant Hardiness Zone ^{3/}
	lbs./ac.	lbs./1,000 sq.ft.		7a and 7b
<i>Cool-Season Grasses</i>				
Annual Ryegrass <i>Lolium perenne</i> ssp. <i>multiflorum</i>	40	1.0	0.5	Feb 15 to Apr 30 Aug 15 to Nov 30
Barley <i>Hordeum vulgare</i>	96	2.2	1.0	Feb 15 to Apr 30 Aug 15 to Nov 30
Oats <i>Avena sativa</i>	72	1.7	1.0	Feb 15 to Apr 30 Aug 15 to Nov 30
Wheat <i>Triticum aestivum</i>	120	2.8	1.0	Feb 15 to Apr 30 Aug 15 to Nov 30
Cereal Rye <i>Secale cereale</i>	112	2.8	1.0	Feb 15 to Apr 30 Aug 15 to Dec 15
<i>Warm-Season Grasses</i>				
Foxtail Millet <i>Setaria italica</i>	30	0.7	0.5	May 1 to Aug 15
Pearl Millet <i>Pennisetum glaucum</i>	20	0.5	0.5	May 1 to Aug 15

TABLE 3 NOTES:

1. Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. No adjustments are necessary for the cool-season grasses.

Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 the seeding rate listed above for barley, oats, wheat, and cereal rye. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5% (by weight) of the overall permanent seeding mix.

Oats are the recommended nurse crop for warm-season grasses. Do not use cereal rye with warm-season grasses; it has been shown to have allelopathic properties that inhibit the germination and growth of warm-season grasses.

2. For sandy soils, plant seeds at twice the depth listed above.

The planting dates listed are averages for each Zone and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

TABLE 4: Recommended Planting Dates for Permanent Cover in Delaware ^{1/}

Type of Plant Material	Plant Hardiness Zones
	7a and 7b
Seeds - Cool-Season Grasses (including mixes with forbs and/or legumes)	Feb 15 to Apr 30 Aug 15 to Oct 31 Nov 1 to Nov 30♦
Seeds – Warm-Season/Cool-Season Grasses (including mixes with forbs and/or legumes)	Feb 15 to Apr 30♦♦ May 1 to May 31*
Sprigs – Warm-Season Grasses	April 1 to May 15
Sod – Cool-Season	Feb 15 to Apr 30 May 1 to Sep 30* Oct 1 to Dec 1*✦
Unrooted Woody Plant Materials; Bare-Rooted Plants; Bulbs, Rhizomes, Corms, and Tubers ^{2/}	Feb 15 to Apr 30 May 1 to Jun 30*
Containerized Stock; Balled and Burlapped Stock	Feb 15 to Apr 30 May 1 to Jun 30* Oct 1 to Dec 15*✦

TABLE 4 NOTES:

- The planting dates listed are averages for each zone. These dates may require adjustment to reflect local conditions, especially near the boundaries of the zones. When seeding toward the end of the listed planting dates, or when conditions are expected to be less than optimal, select an appropriate nurse crop from Table 3 and plant with the permanent seeding mix. (See Table 3, Note 1 for more information.)
- When planted during the growing season, most of these materials must be purchased and kept in a dormant condition until planting. Bare-rooted grasses are the exception--they may be supplied as growing (non-dormant) plants.
 - ♦ Additional planting dates for the lower Coastal Plain, dependent on annual rainfall and temperature trends. Recommend adding a nurse crop, as noted above, if planting during this period.
 - ♦♦ Warm-season grasses need a soil temperature of at least 50 degrees F in order to germinate. If soil temperatures are colder than 50 degrees, or moisture is not adequate, the seeds will remain dormant until conditions are favorable. In general, planting during the latter portion of this period allows more time for weed emergence and weed control prior to planting. When selecting a planting date, consider the need for weed control vs. the likelihood of having sufficient moisture for later plantings, especially on droughty sites.
 - * Additional planting dates during which supplemental watering may be needed to ensure plant establishment.
 - ✦ Frequent freezing and thawing of wet soils may result in frost-heaving of materials planted in late fall, if plants have not sufficiently rooted in place. Sod usually needs 4 to 6 weeks to become sufficiently rooted. Large containerized and balled and burlapped stock may be planted into the winter months as long as the ground is not frozen.

TABLE 5: Recommended Permanent Seeding Mixtures by Site Condition or Purpose														
Site Condition or Purpose of the Planting	Recommended Mix (see Table 6)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Steep Slopes, Roadsides	✓	✓	✓	◆	✓	◆				◆	◆	✓	✓	
Sand and Gravel Pits, Sanitary Landfills	✓	✓	✓	◆	✓	◆				◆	◆	✓		
Salt-Damaged Areas	◆												✓	
Mine Spoil, Dredged Material, and Spoil Banks	◆		✓	◆	◆									
Utility Rights-of-Way	✓	✓	✓	✓	✓	✓	◆			✓	✓	✓		
Dikes and Dams	◆	◆	✓	◆		✓	✓	◆		✓	✓	✓		
Berms, Low Embankments (<u>not</u> on Ponds)	✓	✓	✓	✓	✓	✓	◆	◆		✓	✓	✓	◆	
Pond and Channel Banks, Streambanks	✓	✓	✓	✓	◆	◆	◆			◆	◆			
Grassed Waterways, Diversions, Terraces, Spillways	◆				◆	✓	✓	◆	✓		✓		◆	
Bottom of Drainage Ditches, Swales, Detention Basins				◆		✓	◆			◆	✓		✓	
Field Borders, Filter Strips, Contour Buffer Strips	✓	✓	✓	◆	◆	✓	◆	✓	✓	✓	✓	✓	◆	
Vegetated Treatment Areas (for Wastewater Treatment)								✓	◆	◆				
Heavy Use Areas (Grass Loafing Paddocks for Livestock)								✓						✓
Athletic Fields, Residential and Commercial Lawns							◆	✓	✓		✓			
Recreation Areas							✓	✓	✓		✓			

TABLE 5 NOTES:

✓ Recommended mix for this site condition or purpose.

◆ Alternative mix, depending on site conditions.

TABLE 6: Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate ^{1/}		Soil Drainage Class ^{2/}	Max. Height (feet)	Maint. Level ^{3/}	Remarks
		lbs./ac.	lbs./1000 sq. ft.				
WARM-SEASON/COOL-SEASON GRASS MIXES							
1. SELECT ONE WARM-SEASON GRASS:							
Switchgrass <i>Panicum virgatum</i> OR	Blackwell, Carthage, Cave-in-Rock, or Shelter	10	0.23	E – P	4 - 7	C - D	All species are native to Delaware. Plant this mix with a regular grass drill. Creeping red fescue is a cool-season grass that will provide erosion protection while the warm-season grass is becoming established. Switchgrass, coastal panicgrass, the 'Dawson' variety of creeping red fescue, and partridge pea are moderately salt-tolerant. Bush clover and wild indigo do not tolerate wet sites.
Coastal Panicgrass <i>Panicum amarum</i>	Atlantic	10	0.23				
AND ADD: Creeping Red Fescue <i>Festuca rubra</i>	Dawson, Jasper, Navigator	15	0.34				
PLUS ONE OF THE FOLLOWING LEGUMES: Partridge Pea <i>Chamaecrista fasciculata</i>	Common	4	0.09				
Bush Clover <i>Lespedeza capitata</i>	Common	2	0.05				
Wild Indigo <i>Baptisia tinctoria</i>	Common	2	0.05				
2. Big Bluestem <i>Andropogon gerardii</i>							
Indiangrass <i>Sorghastrum nutans</i>	Rumsey	6	0.14	E – MW	6 - 8	C - D	All species are native to Delaware. The indiagrass and bluestems have fluffy seeds. Plant with a specialized native seed drill. Creeping red fescue is a cool-season grass that will provide erosion protection while the warm-season grasses are becoming established.
Little Bluestem <i>Andropogon gerardii</i>	Aldous or Blaze	4	0.09				
Creeping Red Fescue <i>Festuca rubra</i>	Dawson, Jasper, Navigator	15	0.34				
PLUS ONE OF THE FOLLOWING LEGUMES: Partridge Pea <i>Chamaecrista fasciculata</i>	Common	4	0.09				
Bush Clover <i>Lespedeza capitata</i>	Common	2	0.05				
Wild Indigo <i>Baptisia tinctoria</i>	Common	2	0.05				
Showy Tick-Trefoil <i>Desmodium canadense</i>	Common	1	0.02				

TABLE 6: Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate ^{1/}		Soil Drainage Class ^{2/}	Max. Height (feet)	Maint. Level ^{3/}	Remarks
		lbs./ac.	lbs./1000 sq .ft.				
<i>WARM-SEASON/COOL-SEASON GRASS MIXES</i>							
3. SELECT THREE GRASSES:							
Deertongue <i>Dicanthelium clandestinum</i>	Tioga	20	0.46	E - MW	4 - 6	C - D	Excellent for excessively droughty, low pH (acidic) soils. Sheep fescue, Canada wild rye, and redtop are cool-season grasses that will provide erosion protection while the warm-season grass (deertongue) is becoming established.
Sheep Fescue <i>Festuca ovina</i> OR	Bighorn	20	0.46				
Canada Wild Rye <i>Elymus canadensis</i>	Common	3	0.07				
Redtop <i>Agrostis gigantea</i>	Streaker	1	0.02				
PLUS ONE OF THE FOLLOWING LEGUMES:							
Round Bushclover <i>Lespedeza capitata</i>	Common	2	0.11				
Wild Indigo <i>Baptisia tinctoria</i>	Common	2	0.11				
4. Deertongue <i>Dicanthelium clandestinum</i>							
Creeping Red Fescue <i>Festuca rubra</i>	Dawson, Jasper, Navigator	20	0.46	W - P	2 - 3	C - D	Use Virginia wild rye on moist, shady sites. Use Canada wild rye on droughty sites.
Virginia Wild Rye <i>Elymus virginicus</i> OR	Common	5	0.11				
Canada Wild Rye <i>Elymus canadensis</i>	Common	5	0.11				

TABLE 6: Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate ^{1/}		Soil Drainage Class ^{2/}	Max. Height (feet)	Maint. Level ^{3/}	Remarks
		lbs./ac.	lbs./1000 sq. ft.				
COOL-SEASON GRASS MIXES							
5. SELECT TWO GRASSES:							
Creeping Red Fescue <i>Festuca rubra</i> OR	Dawson, Jasper, Navigator	20	0.46				Use creeping red fescue or hard fescue in heavy shade, but only hard fescue in sunny conditions and/or droughty soils.
Hard Fescue <i>Festuca brevipila</i> (formerly <i>Festuca trachyphylla</i>)	Beacon, Gotham Spartan, Sword	20	0.46				Perennial ryegrass and redtop will establish more rapidly than either fescue. Redtop tolerates wet sites better than ryegrass.
Perennial Ryegrass <i>Lolium perenne</i> OR	Recommended DE turf-types	10	0.23	E - SP	2 - 3	B - D	
Redtop <i>Agrostis gigantea</i>	Streaker	1	0.02				Flatpea will suppress woody vegetation. It should be planted in the spring or as a dormant seeding (overseeding) in late fall or winter. It may not be winter-hardy if planted late summer - fall.
AND ADD THE FOLLOWING LEGUME:							
Flatpea <i>Lathyrus sylvestris</i>	Lathco	15	0.34				
6. Tall Fescue <i>Schedonorus arundinaceus</i> (formerly <i>Festuca arundinacea</i>)							
Perennial Ryegrass <i>Lolium perenne</i>	Recommended DE turf-types	40	0.93				
PLUS ONE OF THE FOLLOWING LEGUMES:	Recommended DE turf-types	25	0.57	W - SP	2 - 3	C - D	
Tick Trefoil <i>Desmodium canadense</i>	Common	1	0.02				
White Clover <i>Trifolium repens</i>	Common	5	0.11				
7. Creeping Red Fescue <i>Festuca rubra</i>							
	Dawson, Jasper, Navigator	60	1.38				
Kentucky Bluegrass <i>Poa pratensis</i>	Recommended DE turf-types	15	0.34	W - MW	1 - 2	C - D	This mix has good shade tolerance.

TABLE 6: Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate ^{1/}		Soil Drainage Class ^{2/}	Max. Height (feet)	Maint. Level ^{3/}	Remarks
		lbs./ac.	lbs./1000 sq. ft.				
<i>COOL-SEASON GRASS MIXES</i>							
8. Tall Fescue <i>Schedonorus arundinaceus</i> (formerly <i>Festuca arundinacea</i>)	Recommended DE turf-types	100	2.3	E - SP	2 - 3	A - D	Tall fescue produces a dense turf if frequently mowed, but tends to be clumpy if mowed only occasionally. For best results, recommend using a blend of 3 cultivars. Use endophyte-friendly cultivars in areas where livestock may graze.
9. SELECT ONE SPECIES OF FESCUE: Tall Fescue <i>Schedonorus arundinaceus</i> OR Hard Fescue <i>Festuca brevipila</i> (formerly <i>Festuca trachyphylla</i>) AND ADD: Kentucky Bluegrass <i>Poa pratensis</i> Perennial Ryegrass <i>Lolium perenne</i>	Recommended DE turf-types Beacon, Gotham Spartan, Sword Recommended DE turf-types Recommended DE turf-types	60 40 40 20	1.38 0.92 0.92 0.46	 W - SP	 2 - 3	 A - B	Good for highly managed athletic fields. Tall fescue is more suitable for compacted, high use areas and on moist sites. Hard fescue produces finer-textured turf with more shade tolerance. Use tall fescue instead of hard fescue for vegetated treatment areas. For best results, recommend using a blend of 3 cultivars each for tall fescue and Kentucky bluegrass.
10. Orchardgrass <i>Dactylis glomerata</i> Creeping Red Fescue <i>Festuca rubra</i> Redtop <i>Agrostis gigantea</i> Alsike Clover <i>Trifolium hybridum</i> White Clover <i>Trifolium repens</i>	Any Dawson, Jasper, Navigator Streaker Common Common	25 10 1 3 3	0.57 0.23 0.02 0.07 0.07	 W - SP	 2 - 3	 C - D	Low maintenance mix that is easy to establish. Omit the clovers if using this mix for vegetated treatment areas.

TABLE 6: Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate ^{1/}		Soil Drainage Class ^{2/}	Max. Height (feet)	Maint. Level ^{3/}	Remarks
		lbs./ac.	lbs./1000 sq. ft.				
COOL-SEASON GRASS MIXES							
11. Creeping Red Fescue <i>Festuca rubra</i>	Dawson, Jasper, Navigator	30	0.69				Suitable mix for shady turf area.
Chewings Fescue <i>Festuca rubra ssp.fallax</i>	Cascade, Fairmont, Intrigue, Lacrosse, Long-fellow, Radar, Treazure, Wrigley, Zodiac	30	0.69	E - MW	2 - 3	B - D	
Kentucky Bluegrass <i>Poa pratensis</i>	Recommended DE turf-types	20	0.46				
<u>OPTIONAL ADDITION</u>							
Rough Bluegrass <i>Poa trivialis</i>	Laser, Saber	15	0.34				Add rough bluegrass in moist, shady conditions only.
12. Creeping Red Fescue <i>Festuca rubra</i>	Dawson, Jasper, Navigator	25	0.57				Attractive mix of fine fescues and wildflowers for low maintenance conditions. Once well established, the grasses may tend to outcompete the wildflowers.
Hard Fescue <i>Festuca brevipila</i> (formerly <i>Festuca trachyphylla</i>)	Beacon, Gotham Spartan, Sword	25	0.57				
Sheep Fescue <i>Festuca ovina</i>	Bighorn	25	0.57				Wildflowers are best established by broadcasting and cultipacking on a prepared seedbed. Drilling can be also used, but care must be taken so that seeds are not drilled too deep.
<u>PLUS WILDFLOWER MIX:</u>							
Black-eyed Susan <i>Rudbeckia hirta</i>	Common	2	0.05	E - MW	2 - 3	C - D	
Lance-leaved Coreopsis <i>Coreopsis lanceolata</i>	Common	2	0.05				Hydroseeding is not recommended for this mix if wildflowers are used because of their very small seed.
Purple Coneflower <i>Echinacea purpurea</i>	Common	2	0.05				
Partridge Pea <i>Chamaecrista fasciculata</i>	Common	5	0.11				
<u>OR ADD CLOVER MIX:</u>							
White Clover <i>Trifolium repens</i>	Common	3	0.07				
Red Clover <i>Trifolium pratense</i>	Any	3	0.07				

TABLE 6: Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate ^{1/}		Soil Drainage Class ^{2/}	Max. Height (feet)	Maint. Level ^{3/}	Remarks
		lbs./ac.	lbs./1000 sq. ft.				
COOL-SEASON GRASS MIXES							
13. Alkali Saltgrass <i>Puccinellia distans</i>	Fults or Salty	20	0.46	W - P	2 - 3	B - D	This is the recommended mix for saline sites. Saltgrass will persist only under saline conditions. For best results, use only the 'Dawson' variety of creeping red fescue. It is a salt-tolerant variety. Add bentgrass for wetter conditions.
Creeping Red Fescue <i>Festuca rubra</i>	Dawson	15	0.34				
Fowl Meadowgrass <i>Poa palustris</i>	Common	2	0.05				
OPTIONAL ADDITION Creeping Bentgrass <i>Agrostis stolonifera</i>	Seaside	2	0.05				
WARM-SEASON GRASS							
14. Bermudagrass <i>Cynodon dactylon</i>	Quickstand, Patriot, Tufcote	Plant sprigs at 25 - 40 bu./ac.	Plant sprigs at 0.57 - 0.92 bu./1000 sq.ft.	W - SP	1 - 2	B - D	Suitable for summer heavy use areas for livestock. Caution: Can spread rapidly into adjacent cool-season plantings. Broadcast sprigs on a prepared seedbed. Lightly disk (1-2 inches) to incorporate, and follow with a field roller or cultipacker to firm the soil. One bushel (1.25 cu. ft.) contains approx. 1,000 plants.

TABLE 6 NOTES:

- Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. No adjustments are necessary for the cool-season grasses, legumes, or wildflowers. All legume seeds shall be inoculated before planting with the appropriate *Rhizobium* bacteria.
- Soil Drainage Class (refer to the county soil survey for further information):
E - Excessively Drained; W - Well Drained; MW - Moderately Well Drained; SP - Somewhat Poorly Drained; P - Poorly Drained.
- Maintenance Level:
A - Intensive mowing (every 2 - 4 days), fertilization, lime, insect and weed control, and watering (examples: high maintenance lawns and athletic fields);
B - Frequent mowing (every 4 - 7 days), occasional fertilization, lime, pest control, and watering (examples: residential, school, and commercial lawns);
C - Periodic mowing (every 7 - 14 days), occasional fertilization and lime (examples: residential lawns, parks);
D - Infrequent or no mowing, fertilization, or lime after the first year of establishment (examples: wildlife areas, roadsides, steep banks).

TABLE 7: Quality of Seed					
Species	Minimum Seed Purity (%)	Minimum Seed Germination (%)	Species	Minimum Seed Purity (%)	Minimum Seed Germination (%)
<i>COOL-SEASON GRASSES</i>			<i>WARM-SEASON GRASSES</i>		
Barley	98	85	Bluestem, Big	60	60
Bentgrass, Creeping	95	85	Bluestem, Little	55	60
Bluegrass, Canada	90	80	Deertongue	95	75
Bluegrass, Kentucky	90	80	Indiangrass	60	60
Bluegrass, Rough	90	80	Millet, Foxtail or Pearl	98	80
Fescue, Chewings	95	85	Panicgrass, Coastal	95	70
Fescue, Creeping Red	95	85	Switchgrass	95	75
Fescue, Hard	95	85	<i>LEGUMES/FORBS</i>		
Fescue, Sheep	95	85	Clover, Alsike	99	85
Fescue, Tall	95	85	Clover, Bush	--	--
Meadowgrass, Fowl	--	--	Clover, Red	99	85
Oats	98	85	Clover, White	98	90
Orchardgrass	90	80	Flatpea	98	75
Redtop	92	80	Indigo, Wild	--	--
Rye, Cereal	98	85	Pea, Partridge	98	70
Ryegrass, Annual or Perennial	95	85	Tick-Trefoil, Showy	--	--
Saltgrass, Alkali	85	80	Trefoil, Birdsfoot	98	85
Wheat	98	85	Wildflowers	--	--
Wild Rye, Canada	85	70			
Wild Rye, Virginia	--	--			

TABLE 7 NOTE:

1. All seed shall comply with the Delaware Seed Law. Seed shall be free of prohibited or restricted noxious weeds, as currently listed by the Delaware Department of Agriculture, Plant Industries Section.