Reshaping the existing land surface to provide suitable topography for building facilities and other site improvements.

Conditions Where Practice Applies

To provide erosion control and vegetative establishment for extreme changes in grade.

Earth disturbances or extreme grade modifications on steep or long slopes

Design Criteria

The grading plan should be based on the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surroundings to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operation related to slope stability, adjacent properties, drainage patterns, measures for water removal, and vegetative treatment, etc.

Many jurisdictions have regulations and design procedures already established for land grading that must be followed. The plan must show existing and proposed contours for the area(s) to be graded including practices for erosion control, slope stabilization, and safe conveyance of runoff (e.g., waterways, lined channels, reverse benches, grade stabilization structures). The grading/construction plans are to include the phasing of these practices and consideration of the following:

- 1. Provisions to safely convey surface runoff to storm drains, protected outlets or stable water courses to ensure that surface runoff will not damage slopes or other graded areas.
- 2. Cut and fill slopes, stabilized with grasses, no steeper than 2:1. (Where the slope is to be mowed, the slope should be no steeper than 3:1, but 4:1 is preferred because of safety factors related to mowing steep slopes.) Slopes steeper than 2:I require special design and stabilization considerations to be
- Benching per Detail B-3-1 whenever the vertical interval (height) of any 2:1 slope exceeds 20 feet; for 3:I slopes, when it exceeds 30 feet; and for 4:I slopes, when it exceeds 40 feet. Locate benches to divide the slope face as equally as possible and to convey the water to a stable outlet. Soils, seeps, rock outcrops, etc. are to be taken into consideration when designing benches.
- a. Provide benches with a minimum width of six feet for ease of maintenance.
- b. Design benches with a reverse slope of 6:l or flatter to the toe of the upper slope and with a minimum of one foot in depth. Grade the longitudinal slope of the bench between 2 percent and 3 percent, unless accompanied by appropriate design and computations.
- c. The maximum allowable flow length within a bench is 800 feet unless accompanied by
- appropriate design and computations. 4. Diversion of surface water from the face of all cut and fill slopes using earth dikes or swales. Convey
- surface water down slope using a designed structure, and:

drainage ways, graded swales, downspouts, etc.

- a. Protect the face of all graded slopes from surface runoff until they are stabilized.
- c. Protect the face of the slope by special erosion control materials to include, but not be limited to,

b. Do not subject the slope's face to any concentrated flow of surface water such as from natural

- approved vegetative stabilization practices, riprap or other approved stabilization methods. . Serrated slope as shown in Detail B-3-2. The steepest allowable slope for ripable rock is 1.5:1. For
- moisture, lime, fertilizer and seed thus producing a much quicker and longer lived vegetative cover and better slope stabilization.

non rock surfaces, the slopes are to be 2:1 or flatter. These steps will weather and act to hold

- . Subsurface drainage provisions. Provide subsurface drainage where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.
- Proximity to adjacent property. Slopes must not be created close to property lines without adequate protection against sedimentation, erosion, slippage, settlement, subsidence, or other related
- 8. Quality of fill material. Fill material must be free of brush, rubbish, logs, stumps, building debris, and other objectionable material. Do not place frozen materials in the fill nor place the fill material on a frozen foundation.
- . Stabilization. Stabilize all disturbed areas structurally or vegetatively in compliance with Section B-4 Standards and Specifications for Stabilization Practices.

The line, grade, and cross section of benching and serrated slopes must be maintained. Benches and serrated slopes must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization.

B-4 STANDARDS AND SPECIFICATIONS VEGETATIVE STABILIZATION

Using vegetation as cover to protect exposed soil from erosion.

subsequent plant growth.

To promote the establishment of vegetation on exposed soil.

Conditions Where Practice Applies

On all disturbed areas not stabilized by other methods. This specification is divided into sections on incremental stabilization; soil preparation, soil amendments and topsoiling; seeding and mulching; temporary stabilization; and permanent stabilization.

Effects on Water Quality and Quantity

Stabilization practices are used to promote the establishment of vegetation on exposed soil. When soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and runoff to downstream areas.

Planting vegetation in disturbed areas will have an effect on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, percolation, and groundwater recharge. Over time, vegetation will increase organic matter content and improve the water holding capacity of the soil and

Vegetation will help reduce the movement of sediment, nutrients, and other chemicals carried by runoff to receiving waters. Plants will also help protect groundwater supplies by assimilating those substances

Sediment control practices must remain in place during grading, seedbed preparation, seeding, mulching, and vegetative establishment.

Adequate Vegetative Establishment

Inspect seeded areas for vegetative establishment and make necessary repairs, replacements, and reseedings within the planting season.

- 1. Adequate vegetative stabilization requires 95 percent groundcover.
- 2. If an area has less than 40 percent groundcover, restabilize following the original recommendations for lime, fertilizer, seedbed preparation, and seeding.
- 3. If an area has between 40 and 94 percent groundcover, over-seed and fertilize using half of the rates
- 4. Maintenance fertilizer rates for permanent seeding are shown in Table B.6.

B-4-1 STANDARDS AND SPECIFICATIONS INCREMENTAL STABILIZATION

Purpose

Establishment of vegetative cover on cut and fill slopes.

To provide timely vegetative cover on cut and fill slopes as work progresses Conditions Where Practice Applies

Any cut or fill slope greater than 15 feet in height. This practice also applies to stockpiles.

A. Incremental Stabilization - Cut Slopes

- 1. Excavate and stabilize cut slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all cut slopes as the work progresses.
- 2. Construction sequence example (Refer to Figure B.1):

necessitate the application of temporary stabilization.

- a. Construct and stabilize all temporary swales or dikes that will be used to convey runoff around
- b. Perform Phase 1 excavation, prepare seedbed, and stabilize.

- c. Perform Phase 2 excavation, prepare seedbed, and stabilize. Overseed Phase 1 areas as
- d. Perform final phase excavation, prepare seedbed, and stabilize. Overseed previously seeded
- Note: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will

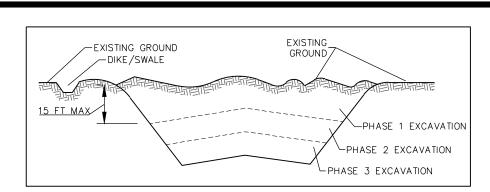
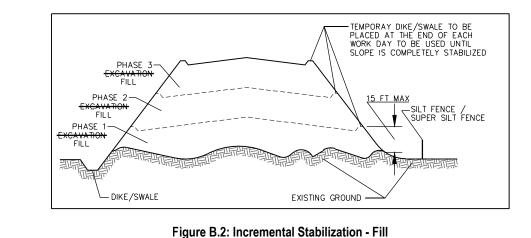


Figure B.2: Incremental Stabilization - Cut

B. Incremental Stabilization - Fill Slopes

- 1. Construct and stabilize fill slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all slopes as the work progresses.
- Stabilize slopes immediately when the vertical height of a lift reaches 15 feet, or when the grading operation ceases as prescribed in the plans.
- 3. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
- 4. Construction sequence example (Refer to Figure B.2):
- a. Construct and stabilize all temporary swales or dikes that will be used to divert runoff around the The application of seed and mulch to establish vegetative cover fill. Construct silt fence on low side of fill unless other methods shown on the plans address this
- b. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
- c. Place Phase 1 fill, prepare seedbed, and stabilize.
- d. Place Phase 2 fill, prepare seedbed, and stabilize.
- e. Place final phase fill, prepare seedbed, and stabilize. Overseed previously seeded areas as
- Note: Once the placement of fill has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.



B-4-2 STANDARDS AND SPECIFICATIONS

SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

The process of preparing the soils to sustain adequate vegetative stabilization.

To provide a suitable soil medium for vegetative growth.

Where vegetative stabilization is to be established.

A. Soil Preparation

- Temporary Stabilization
- a. Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
- b. Apply fertilizer and lime as prescribed on the plans.
- c. Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means. B. Mulching
- 2. Permanent Stabilization
- a. A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:
- i. Soil pH between 6.0 and 7.0.
- ii. Soluble salts less than 500 parts per million (ppm).
- iii. Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception: if lovegrass will be planted, then a sandy soil (less than 30 percent silt plus clay) would be
- iv. Soil contains 1.5 percent minimum organic matter by weight.
- v. Soil contains sufficient pore space to permit adequate root penetration.
- b. Application of amendments or topsoil is required if on-site soils do not meet the above
 - c. Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
- d. Apply soil amendments as specified on the approved plan or as indicated by the results of a soil
- e. Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment

to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges

running parallel to the contour of the slope. Leave the top 1 to 3 inches of soil loose and friable. Seedbed loosening may be unnecessary on newly disturbed areas.

- 1. Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture
- content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation. Topsoil salvaged from an existing site may be used provided it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-NRCS.
- 3. Topsoiling is limited to areas having 2:1 or flatter slopes where:
- a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth
- b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
- c. The original soil to be vegetated contains material toxic to plant growth. d. The soil is so acidic that treatment with limestone is not feasible.
- 4. Areas having slopes steeper than 2:1 require special consideration and design.
- 5. Topsoil Specifications: Soil to be used as topsoil must meet the following criteria:
- a. Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the
- and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1½ inches in diameter. b. Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass,

appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils

- Johnson grass, nut sedge, poison ivy, thistle, or others as specified. c. Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.
- 6. Topsoil Application
- a. Erosion and sediment control practices must be maintained when applying topsoil
- b. Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. Spreading is to be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations must be corrected in order to prevent the formation of depressions or water pockets.
- c. Topsoil must not be placed if the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.
- 5. Soil Amendments (Fertilizer and Lime Specifications)
- Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a recognized private or commercial laboratory. Soil samples taken for engineering purposes may also

- be used for chemical analyses
- 2. For sites having soil tests performed, use and show the recommended rates by the testing agency. 2. Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer.
- 3. Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh
- sieve and 98 to 100 percent will pass through a #20 mesh sieve. **Plant Species** 4. Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.
- 5. Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

B-4-3 STANDARDS AND SPECIFICATIONS

SEEDING AND MULCHING

To protect disturbed soils from erosion during and at the end of construction.

To the surface of all perimeter controls, slopes, and any disturbed area not under active grading. Criteria

Conditions Where Practice Applies

A. Seeding

Specifications

Application

- a. All seed must meet the requirements of the Maryland State Seed Law. All seed must be subject to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to Table B.4 regarding the quality of seed. Seed tags must be available upon request to the inspector to verify type of seed and seeding rate.
- b. Mulch alone may be applied between the fall and spring seeding dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws.
- c. Inoculants: The inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75 to 80 degrees Fahrenheit can weaken bacteria and make the inoculant less effective.
- d. Sod or seed must not be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.
- a. Dry Seeding: This includes use of conventional drop or broadcast spreaders. i. Incorporate seed into the subsoil at the rates prescribed on Temporary Seeding Table B.1,

Permanent Seeding Table B.3, or site-specific seeding summaries.

- ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil contact.
- b. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil.
- Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting. ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each
- c. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer).
- i. If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre total of soluble nitrogen; P2O5 (phosphorous), 200 pounds per acre; K2O (potassium), 200 pounds per acre.
- ii. Lime: Use only ground agricultural limestone (up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydrated lime when hydroseeding.
- iii. Mix seed and fertilizer on site and seed immediately and without interruption. iv. When hydroseeding do not incorporate seed into the soil.

growth of the grass seedlings.

rate to 2.5 tons per acre.

should follow the contour.

Anchoring

phyto-toxic.

- 1. Mulch Materials (in order of preference) a. Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the Maryland Seed Law and not musty, moldy, caked, decayed, or excessively dusty. Note: Use only sterile straw mulch in areas
- where one species of grass is desired. b. Wood Cellulose Fiber Mulch (WCFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.

ii. WCFM, including dye, must contain no germination or growth inhibiting factors.

iii. WCFM materials are to be manufactured and processed in such a manner that the wood

cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend

form a blotter-like ground cover, on application, having moisture absorption and percolation

properties and must cover and hold grass seed in contact with the soil without inhibiting the

iv. WCFM material must not contain elements or compounds at concentration levels that will be

v. WCFM must conform to the following physical requirements: fiber length of approximately 10

millimeters, diameter approximately 1 millimeter, pH range of 4.0 to 8.5, ash content of 1.6

b. When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a

c. Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per

uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so

that the soil surface is not exposed. When using a mulch anchoring tool, increase the application

acre. Mix the wood cellulose fiber with water to attain a mixture with a maximum of 50 pounds of

a. Perform mulch anchoring immediately following application of mulch to minimize loss by wind or

A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into

the soil surface a minimum of 2 inches. This practice is most effective on large areas, but is

Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight

iii. Synthetic binders such as Acrylic DLR (Agro-Tack), DCA-70, Petroset, Terra Tax II, Terra Tack

mulch, such as in valleys and on crests of banks. Use of asphalt binders is strictly prohibited.

recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000 feet

manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches

AR or other approved equal may be used. Follow application rates as specified by the

iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer

B-4-4 STANDARDS AND SPECIFICATIONS

TEMPORARY STABILIZATION

Definition

Conditions Where Practice Applies

Select one or more of the species or seed mixtures listed in Table B.1 for the appropriate Plant

Hardiness Zone (from Figure B.3), and enter them in the Temporary Seeding Summary below along

with application rates, seeding dates and seeding depths. If this Summary is not put on the plan and

Exposed soils where ground cover is needed for a period of 6 months or less. For longer duration of time,

of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of

water. This may be done by one of the following methods (listed by preference), depending upon

limited to flatter slopes where equipment can operate safely. If used on sloping land, this practice

percent maximum and water holding capacity of 90 percent minimum.

a. Apply mulch to all seeded areas immediately after seeding.

wood cellulose fiber per 100 gallons of water.

the size of the area and erosion hazard:

wood cellulose fiber per 100 gallons of water.

To stabilize disturbed soils with vegetation for up to 6 months

permanent stabilization practices are required.

To use fast growing vegetation that provides cover on disturbed soils

with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material must

- total mixture by weight. . Kentucky Bluegrass/Perennial Rye: Full Sun Mixture: For use in full sun areas where rapid WCFM is to be dyed green or contain a green dye in the package that will provide an appropriate establishment is necessary and when turf will receive medium to intensive management. color to facilitate visual inspection of the uniformly spread slurry. Certified Perennial Ryegrass Cultivars/Certified Kentucky Bluegrass Seeding Rate: 2 pounds
 - mixture per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight. iii. Tall Fescue/Kentucky Bluegrass: Full Sun Mixture: For use in drought prone areas and/or for areas receiving low to medium management in full sun to medium shade. Recommended

completed, then Table B.1 plus fertilizer and lime rates must be put on the plan.

When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch

Table B.1: Temporary Seeding for Site Stabilization

ual Ryegrass | 40 | 1.0 | 0.5 | Mar,1 to May 15; Aug 1 to Oct 15 | Feb 15 to Apr 30; Aug 15 to Nov 3

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. Adjustments are

Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse

crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5%

(by weight) of the overall permanent seeding mix. 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.

The planting dates listed are averages for each Zone and may require adjustment to reflect local

B-4-5 STANDARDS AND SPECIFICATIONS

PERMANENT STABILIZATION

To use long-lived perennial grasses and legumes to establish permanent ground cover on disturbed soils.

Conditions Where Practice Applies

a. Select one or more of the species or mixtures listed in Table B.3 for the appropriate Plant

Hardiness Zone (from Figure B.3) and based on the site condition or purpose found on Table

B.2. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding

b. Additional planting specifications for exceptional sites such as shorelines, stream banks, or

c. For sites having disturbed area over 5 acres, use and show the rates recommended by the soil

d. For areas receiving low maintenance, apply urea form fertilizer (46-0-0) at 3 ½ pounds per 1000

square feet (150 pounds per acre) at the time of seeding in addition to the soil amendments

a. Areas where turfgrass may be desired include lawns, parks, playgrounds, and commercial sites

purpose. Enter selected mixture(s), application rates, and seeding dates in the Permanent

Kentucky Bluegrass: Full Sun Mixture: For use in areas that receive intensive management.

Irrigation required in the areas of central Maryland and Eastern Shore. Recommended Certified

Kentucky Bluegrass Cultivars Seeding Rate: 1.5 to 2.0 pounds per 1000 square feet. Choose a

minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the

b. Select one or more of the species or mixtures listed below based on the site conditions or

dunes or for special purposes such as wildlife or aesthetic treatment may be found in

USDA-NRCS Technical Field Office Guide, Section 342 - Critical Area Planting.

Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be

Recommended Seeding Dates by Plant Hardness Zone 3/

1.0 Mar 1 to May 15; Aug 1 to Oct 15 Feb 15 to Apr 30; Aug 15 to Nov 30

1.0 Mar 1 to May 15; Aug 1 to Oct 15 Feb 15 to Apr 30; Aug 15 to Nov 30

1.0 Mar 1 to May 15; Aug 1 to Qct 15 Feb 15 to Apr 30; Aug 15 to Nov 30

1.0 Mar 1 to May 15; Aug 1 to Nov 15 Feb 15 to Apr 30; Aug 15 to Dec 15

May 1 to Aug 14

alone as prescribed in Section B-4-3.A.1.b and maintain until the next seeding season.

Soil tests are not required for Temporary Seeding.

Seeding Rate 1/

Cereal Rye

Warm-Season Grasses

lb/ac | lb/1000 ft² | (inches)

Foxtail Millet 30 0.7 0.5 May 16 to Jul 31

Pearl Millet 20 0.5 0.5 May 16 to Jul 31

Fertilizer Rate (10-20-20): 436 lb/ac (10 lb/1000 sf)

usually not needed for the cool-season grasses

used as a nurse crop, seed at 1/3 of the rate listed above.

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

conditions, especially near the boundaries of the zone.

To stabilize disturbed soils with permanent vegetation.

A. Seed Mixtures

General Use

2. Turfgrass Mixtures

Exposed soils where ground cover is needed for 6 months or more

Summary. The Summary is to be placed on the plan.

shown in the Permanent Seeding Summary.

which will receive a medium to high level of maintenance.

Seeding Summary. The summary is to be placed on the plan.

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

Lime Rate: 2 tons/ac (90 lb/1000 sf)

mixture includes; Certified Tall Fescue Cultivars 95 to 100 percent, Certified Kentucky Bluegrass Cultivars 0 to 5 percent. Seeding Rate: 5 to 8 pounds per 1000 square feet. One or more cultivars may be blended. iv. Kentucky Bluegrass/Fine Fescue: Shade Mixture: For use in areas with shade in Bluegrass

lawns. For establishment in high quality, intensively managed turf area. Mixture includes;

- Certified Kentucky Bluegrass Cultivars 30 to 40 percent and Certified Fine Fescue and 60 to 70 percent. Seeding Rate: 1½ to 3 pounds per 1000 square feet. Select turforass varieties from those listed in the most current University of Maryland
- Publication, Agronomy Memo #77, "Turfgrass Cultivar Recommendations for Choose certified material. Certified material is the best guarantee of cultivar purity. The certification program of the Maryland Department of Agriculture, Turf and Seed

Section, provides a reliable means of consumer protection and assures a pure genetic

- c. Ideal Times of Seeding for Turf Grass Mixtures Western MD: March 15 to June 1, August 1 to October 1 (Hardiness Zones: 5b, 6a) Central MD: March 1 to May 15, August 15 to October 15 (Hardiness Zone: 6b)
- Southern MD, Eastern Shore: March 1 to May 15, August 15 to October 15 (Hardiness Zones: 7a, 7b) d. Till areas to receive seed by disking or other approved methods to a depth of 2 to 4 inches, level and rake the areas to prepare a proper seedbed. Remove stones and debris over 11/2 inches in diameter. The resulting seedbed must be in such condition that future mowing of grasses will
- pose no difficulty. e. If soil moisture is deficient, supply new seedings with adequate water for plant growth (½ to 1 inch every 3 to 4 days depending on soil texture) until they are firmly established. This is especially true when seedings are made late in the planting season, in abnormally dry or hot seasons, or on adverse sites.

Hardiness Zone (from Figure B.3):-6b or 7a Seed Mixture (see Table B.3 for additional information)						Fertilizer Rate (10-20-20)			
No.	Species		eding ates	Seeding Dates	Seeding Depths	N	P ₂ O ₃	K ₂ O	Lime Rate
1	Switch Grass	10	0.23	(6b) Mar 1 to May 15;					
	or			May 16 to June 15					
	Costal Panic Grass	10	0.23	(7a) Feb 15 to Apr 30; May 1 to May 30		45 lbs per	90 lbs per	90 lbs per	2 tons per
	Creeping Red Fescue	15	0.34						
	Partridge Pea	4	0.09						
	Deertongue &	20	0.46	(6b) Mar 1 to May 15;					
	Sheep Fescue	20	0.46						
3	or		May 16 to June 15	$\frac{1}{4}$ " - $\frac{1}{2}$ "	acre	acre	acre	acre	
S	Canada Wilde Rye &	3	0.07	(7a) Feb 15 to Apr 30; May 1 to May 30 (6b) Mar 1 to May 15; Aug 1 to Oct 15 (7a) Feb 15 to Apr	4 ⁻ 2	(1 lbs/ 1000 sf)	(2 lbs/ 1000 sf)	(2 lbs/ 1000 sf)	(90 lbs/ 1000 sf)
	Redtop	1	0.02						
	Common Lespedeza	10	0.23						
11	Creeping Red Fescue	30	0.69						
	Chewing Fescue	30	0.69						
	Kentucky Bluegrass	20	0.46	30; Aug 15 to Oct 31; Nov 1 to Nov 30*					

B. Sod: To provide quick cover on disturbed areas (2:1 grade or flatter).

- General Specifications a. Class of turforass sod must be Maryland State Certified. Sod labels must be made available to the job foreman and inspector.
- b. Sod must be machine cut at a uniform soil thickness of $\frac{3}{4}$ inch, plus or minus $\frac{1}{4}$ inch, at the time of cutting. Measurement for thickness must exclude top growth and thatch. Broken pads and torn or uneven ends will not be acceptable.

- c. Standard size sections of sod must be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the
- d. Sod must not be harvested or transplanted when moisture content (excessively dry or wet) may
- e. Sod must be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period must be approved by an agronomist or soil scientist prior to its installation.
- a. During periods of excessively high temperature or in areas having dry subsoil, lightly irrigate the subsoil immediately prior to laying the sod.
- b. Lay the first row of sod in a straight line with subsequent rows placed parallel to it and tightly wedged against each other. Stagger lateral joints to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots.
- c. Wherever possible, lay sod with the long edges parallel to the contour and with staggering joints. Roll and tamp, peg or otherwise secure the sod to prevent slippage on slopes. Ensure solid
- contact exists between sod roots and the underlying soil surface. d. Water the sod immediately following rolling and tamping until the underside of the new sod pad
- and soil surface below the sod are thoroughly wet. Complete the operations of laying, tamping

as necessary to maintain moist soil to a depth of 4 inches. Water sod during the heat of the day

and irrigating for any piece of sod within eight hours. Sod Maintenance

2. Sod Installation

- a. In the absence of adequate rainfall, water daily during the first week or as often and sufficiently
- to prevent wilting. b. After the first week, sod watering is required as necessary to maintain adequate moisture
- c. Do not mow until the sod is firmly rooted. No more than \(\frac{1}{3}\) of the grass leaf must be removed by the initial cutting or subsequent cuttings. Maintain a grass height of at least 3 inches unless

B-4-6 STANDARDS AND SPECIFICATIONS

SOIL STABILIZATION MATTING

Material used to temporarily or permanently stabilize channels or steep slopes until groundcover is

To protect the soils until vegetation is established Conditions Where Practice Applies

On newly seeded surfaces to prevent the applied seed from washing out; in channels and on steep slopes where the flow has erosive velocities or conveys clear water; on temporary swales, earth dikes, and perimeter dike swales as required by the respective design standard; and, on stream banks where moving water is likely to wash out new vegetative plantings.

- 1. The soil stabilization matting that is used must withstand the flow velocities and shear stresses determined for the area, based on the 2-year, 24-hour frequency storm for temporary applications and the 10-year, 24-hour frequency storm for permanent applications. Designate on the plan the type of soil stabilization matting using the standard symbol and include the calculated shear stress for the respective treatment area.
- . Matting is required on permanent channels where the runoff velocity exceeds two and half feet per second (2.5 fps) or the shear stress exceeds two pounds per square foot (2 lbs/ft2). On temporary channels discharging to a sediment trapping practice, provide matting where the runoff velocity exceeds four feet per second (4 fps).
- manmade fibers of uniform thickness and distribution of fibers throughout and is smolder resistant. The maximum permissible velocity for temporary matting is 6 feet per second. 4. Permanent soil stabilization matting is an open weave, synthetic material consisting of non-

3. Temporary soil stabilization matting is made with degradable (lasts 6 months minimum), natural, or

maximum permissible velocity for permanent matting is 8.5 feet per second.

degradable fibers or elements of uniform thickness and distribution of weave throughout. The

B-4-7 STANDARDS AND SPECIFICATIONS **HEAVY USE AREA PROTECTION**

Vegetation must be established and maintained so that the requirements for Adequate Vegetative

Establishment are continuously met in accordance with Section B-4 Vegetative Stabilization.

The stabilization of areas frequently and intensively used by surfacing with suitable materials (e.g., mulch

To provide a stable, non-eroding surface for areas frequently used and to improve the water quality from the

and aggregate).

runoff of these areas.

Conditions Where Practice Applies This practice applies to intensively used areas (e.g., equipment and material storage, staging areas, heavily

- used travel lanes).
- 1. A minimum 4-inch base course of crushed stone or other suitable materials including wood chips over nonwoven geotextile should be provided as specified in Section H-1 Materials.
- 3. The transport of sediments, nutrients, oils, chemicals, particulate matter associated with vehicular traffic and equipment, and material storage needs to be considered in the selection of material.

Select the stabilizing material based on the intended use, desired maintenance frequency, and

Additional control measures may be necessary to control some of these potential pollutants. 4. Surface erosion can be a problem on large heavy use areas. In these situations, measures to reduce the flow length of runoff or erosive velocities need to be considered.

The heavy use areas must be maintained in a condition that minimizes erosion. This may require adding suitable material, as specified on the approved plans, to maintain a clean surface.

B-4-8 STANDARDS AND SPECIFICATIONS STOCKPILE AREA

A mound or pile of soil protected by appropriately designed erosion and sediment control measures.

To provide a designated location for the temporary storage of soil that controls the potential for erosion, sedimentation, and changes to drainage patterns.

Stockpile areas are utilized when it is necessary to salvage and store soil for later use 1. The stockpile location and all related sediment control practices must be clearly indicated on the

2. The footprint of the stockpile must be sized to accommodate the anticipated volume of material and

Conditions Where Practice Applies

based on a side slope ratio no steeper than 2:1. Benching must be provided in accordance with Section B-3 Land Grading. 3. Runoff from the stockpile area must drain to a suitable sediment control practice

5. Clear water runoff into the stockpile area must be minimized by use of a diversion device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner. 6. Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control

7. Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement as well as

8. If the stockpile is located on an impervious surface, a liner should be provided below the stockpile to

facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable

Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary Stabilization.

erosion and sediment control plan.

4. Access the stockpile area from the upgrade side.

practice must be used to intercept the discharge.

The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1 slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section B-3 Land Grading.

H-1 STANDARDS AND SPECIFICATIONS

MATERIALS

Table n. 1. Geolexille Fabric										
	WOVEN SILT FILM GEOTEXTILE			WOVEN MONOFILAMENT GEOTEXTILE		NONWOVEN GEOTEXTILE				
		MINIMUM AVERAGE ROLL VALUE 1								
PROPERTY	TEST METHOD	MD	CD	MD	CD	MD	CD			
rab Tensile Strength	ASTM D-4632	200 lb	200 lb	370 lb	370 lb	200 lb	200 lb			
rab Tensile Elongation	ASTM D-4632	15%	10%	15%	15%	50%	50%			
apezoidal Tear Strength	ASTM D-4533	75 lb	75 lb	100 lb	60 lb	80 lb	80 lb			
incture Strength	ASTM D-6241	450 lb		900 lb		80 lb				
oparent Opening Size ²	ASTM D-4751	U.S. Sieve 30 (0.59 mm)		U.S. Sieve 70 (0.21 mm)		U.S. Sieve 70 (0.21 mm)				
ermittivity	ASTM D-4491	0.05 sec ⁻¹		0.28 sec ⁻¹		1.1 sec ⁻¹				
traviolet Resistance Retained at	ASTM D-4355	70% strength		70% strength		70% strength				

Table H 1. Gentevtile Fabric

¹ All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross

placing riprap on geotextile, do not exceed a one foot drop height

Values for AOS represent the average maximum opening. Geotextiles must be evaluated by the National Transportation Product Evaluation Program (NTPEP) and

conform to the values in Table H.1. The geotextile must be inert to commonly encountered chemicals and hydrocarbons and must be rot and mildew resistant. The geotextile must be manufactured from fibers consisting of long chain synthetic polymers and composed of a minimum of 95 percent by weight of polyolefins or polyesters, and formed into a stable network so the filaments or yarns retain their dimensional stability relative to each other, including

When more than one section of geotextile is necessary, overlap the sections by at least one foot. The geotextile must be pulled taut over the applied surface. Equipment must not run over exposed fabric. When

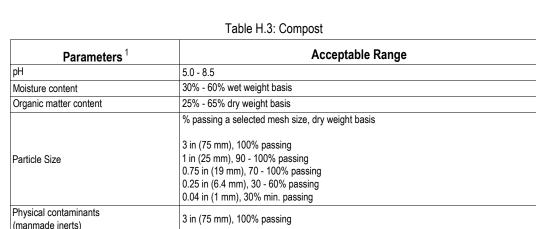
Table H.2: Stone Size									
TYPE	SIZE RANGE	D ₅₀	D ₁₀₀	AASHTO	MIDSIZE WEIGHT				
NUMBER 57 ¹	3/8 to 1 ½ inch	1/2 in	1 ½ in	M-43	N/A				
NUMBER 1	2 to 3 inch	2 ½ in	3 in	M-43	N/A				
RIPRAP ² (CLASS 0)	4 to 7 inch	5 ½ in	7 in	N/A	N/A				
CLASS I	N/A	9 ½ in	15 in	N/A	40 lb				
CLASS II	N/A	16 in	24 in	N/A	200 lb				
CLASS III	N/A	23 in	34 in	N/A	600 lb				

This classification is to be used on the upstream face of stone outlets and check dams. ² This classification is to be used for gabions.

size for which 50 percent, by weight, will be smaller and 50 percent will be larger.

Optimum gradation is 50 percent of the stone being above and 50 percent below the midsize. Stone must be composed of a well graded mixture of stone sized so that fifty (50) percent of the pieces by PGSCD, shall invalidate the plan approval. weight are larger than the size determined by using the charts. A well graded mixture, as used herein, is defined as a mixture composed primarily of larger stone sizes but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The diameter of the largest stone in such a mixture must not exceed the respective d100 selected from Table H.2. The d50 refers to the median diameter of the stone. This is the

Note: Recycled concrete equivalent may be substituted for all stone classifications for temporary control measures only. Concrete broken into the sizes meeting the appropriate classification, containing no steel a minimum density of 150 pounds per cubic foot may be used as an equivalent



Adapted from AASHTO Standards Specs for Compost Filter Socks and EPA Example Compost Filter

Recommended test methodologies are provided in Test Methods for the Examination of Composting and Compost (TMEC, The U.S Composting Council).

All sediment control plans shall include the following general notes:

a. The developer is responsible for the acquisition of all required easement, right and/or rights-of-way pursuant to the discharge from the erosion and sediment control practices, stormwater management practices and the discharge of stormwater onto or across and grading or other work to be performed

on adjacent or downstream properties affected by this plan. b.Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed within: a) three (3) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes greater than three horizontal to one vertical (3:1) and b) seven (7) calendar days for all other disturbed or graded areas on the project site. The in-place sediment control measures will be maintained on a continuing basis until the site is

permanently stabilized and all permit requirements are met. c. The Onwer/Developer or representative shall request that the inspection authority approve work completed in accordance with the approved erosion and sediment control plan, the grading permit or building permit and shall obtain written inspection approvals by the Inspector at the following stages

1. Prior to the start of earth disturbance;

in the development of the site:

2. Upon completion of installation of tree protection devices, followed by the installation of perimeter erosion and sediment controls, prior to proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until initial approval by the

3. Upon completion of stripping, the stockpiling of topsoil, the construction of temporary sediment and erosion control facilities; disposal of all waste material and preparation of the ground;

development improvements and ground covers;

6. Prior to the removal of sediment control practices; and 7. Upon completion of final grading, reforesting, permanent drainage and erosion control facilities

d. Approval shall be requested upon final stabilization of all sites with disturbed areas in excess of two acres before removal of controls. e. All permits under an erosion and sediment control plan must and can only be issued to the

on an erosion and sediment control plan is the responsible party regardless of any sale of the property or work of subcontractors. Erosion and sediment control plans are approved for one owner/developer only. f. PGSCD approval of an erosion and sediment control plan, pursuant to meeting local permit

g.Any changes or modifications to an approved erosion and sediment control plan, not approved by the

1. The owner or engineer will notify PGSCD promptly in writing when construction is begun and when

3. The approval is valid only for use by the applicant and may not be transferred to another unless

construction of the basin.

construction is completed. 2. The project shall be constructed under the supervision of the engineer-in-charge. Within 30 days of the completion of construction, the engineer-in-charge that designed the structure shall provide PGSCD with an As-Built plan and shall certify, with the engineer's seal, that the MD378 pond was constructed as shown on the As-Built plans.

k. The total disturbed area is: 274,428 sq. ft. or 6.3 acres. Area of vegetative stabilization 4.0 acres. Volume of spoil material 0 c.y. Volume of cut 0 c.y. Volume of borrow material 0 c.y.

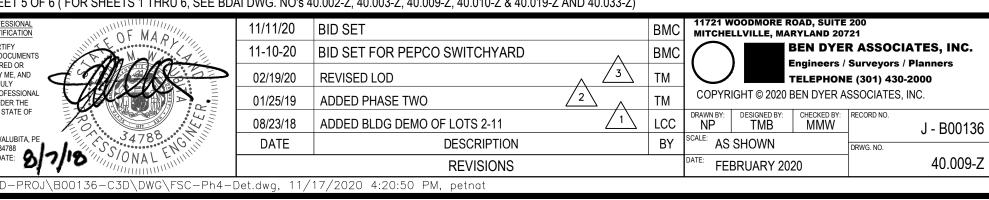
written approval for such transfer is obtained from PGSCD

DPIE PERMIT # 49025-2019

FINAL GRADING, EROSION AND SEDIMENT CONTROL DETAIL SHEET FOR SITE DEMOLITION, ROUGH GRADING, INSTALLATION OF CONTRACTOR'S LAYDOWN AREA & PEPCO SWITCH YARD FOR LOTS 1-8, 11, SUITLAND - 1st ADDITION LOTS 2-10, PARCELS A-D, F, G AND LOT 1 - RESUBDIVISION OF PARCEL D

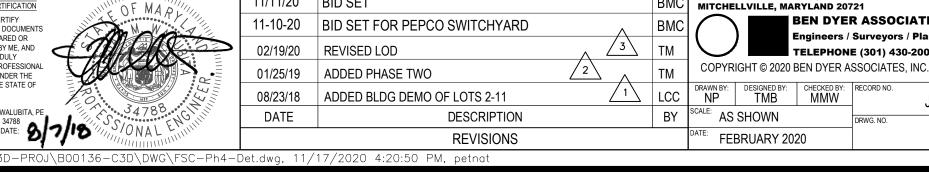
SPAULDING DISTRICT No. 6

PRINCE GEORGE'S COUNTY, MARYLAND



TOWNE SQUARE AT SUITLAND FEDERAL CENTER, PHASE FOUR

FSC SHEET 5 OF 6 (FOR SHEETS 1 THRU 6, SEE BDALDWG, NO's 40,002-7, 40,003-7, 40,009-7, 40,010-7, & 40,019-7, AND 40,033-7).



Inspector is made;

4. Upon completion of rough grading, but prior to placing topsoil, permanent drainage or other site

5. Prior to the start of another phase of construction or opening of another grading unit;

including established ground covers and planting, and all other work of the building permits.

owner/developer that signs the certification on the plan. Owner/developer that signs the certification

requirements for grading, building or street permits, etc., is valid only when the work to be performed under the permit is the same as (no more/no less than) that contained in the plan as approved by the

h. Offsite borrow or soil areas must have an approved and active erosion and sediment control plan. i. Temporary designed sediment basins shall be removed within 36 months after the beginning of

j. On small pond approvals:

Un - Urban Land.

Volume of fill 0 c.y.

I. List of predominant soil types and general description per NRCS web soil survey: