6.66 PERMANENT SEEDING (ES BMP 1.66)

Definition

The establishment of perennial vegetative cover on disturbed areas by planting seed.

Purposes

1. To reduce erosion and decrease sediment yield from disturbed areas.

2. To permanently stabilize disturbed areas in a manner that is economical, adaptable to site conditions, and allows selection of the most appropriate plant materials.

Conditions Where Practice Applies

1. Disturbed areas where permanent, long-lived vegetative cover is needed to stabilize the soil.

2. Rough-graded areas which will not be brought to final grade for a year or more.

Specifications

Selection of Plant Materials

1. Selection of plant materials is based on climate, topography, soils, land use, and planting season. To determine which plant materials are best adapted to a specific site, use Tables 1.66b and 1.66c of The Florida Development Manual which describe plant characteristics and list recommended varieties.

2. Appropriate seeding mixtures for various site conditions in Florida are given in Table 1.66a of The Florida Development Manual. These mixtures are designed for general use, and are known to perform well on the sites described. Adhere to these mixtures whenever feasible. Check Tables 1.66b and 1.66c for recommended varieties.

Seedbed Requirements

Vegetation should not be established on slopes that are unsuitable due to inappropriate soil texture, poor internal structure or internal drainage, volume of overland flow, or excessive steepness, until measures have been taken to correct these problems.

To maintain a good stand of vegetation, the soil must meet certain minimum requirements as a growth medium. The existing soil must have these criteria:

1. Enough fine-grained material to maintain adequate moisture and nutrient supply.

2. Sufficient pore space to permit root penetration. A bulk density of 1.2 to 1.5

indicates that sufficient pore space is present. A fine granular or crumb-like structure is also favorable.

3. Sufficient depth of soil to provide an adequate root zone. The depth to rock or impermeable layers such as hardpans shall be 12 inches (30 cm) or more, except on slopes steeper than 2:1 where the addition of soil is not feasible.

4. A favorable pH range for plant growth. If the soil is so acid that a pH range of 6.0 - 7.0 cannot be attained by addition of pH-modifying materials, then the soil is considered an unsuitable environment for plant roots.

5. Freedom from toxic amounts of materials harmful to plant growth.

6. Freedom from excessive quantities of roots, branches, large stones, large clods of earth, or trash of any kind. Clods and stones may be left on slopes steeper than 3:1 if they are to be hydroseeded.

If any of the above criteria cannot be met, i.e., if the existing soil is too coarse, dense, shallow, acid, or contaminated to foster vegetation, then topsoil should be applied in accordance with TOPSOILING - Section 6.61 (ES BMP 1.61).

Necessary mechanical erosion and sediment control practices ***will be installed prior to seeding***. Grading will be carried out according to the approved plan.

Surfaces will be roughened in accordance with SURFACE ROUGHENING - Section 6.60 (ES BMP 1.60).

Soil Conditioners

In order to modify the texture, structure, or drainage characteristics of a soil, the following materials may be added to the soil:

1. Peat shall be sphagnum moss peat, hypnum moss peat, reed-sedge peat or peat humus, from fresh-water sources. Peat shall be shredded and conditioned in storage piles for at least six months after excavation.

2. Sand shall be clean and free of toxic materials.

3. Vermiculite shall be horizontal grade and free of toxic substances.

4. Rotted manure shall be stable or cattle manure not containing undue amounts of straw or other bedding materials or toxic chemicals.

5. Thoroughly rotted sawdust shall be 6 lbs. of nitrogen added to each cubic yard (3.5 kg/m^3) and shall be free of stones, sticks, and toxic substances.

6. Where local ordinances permit, treated sewage sludge may be used in accordance with local, state, and federal regulations.

separately. Rates of wood fiber should be at least 2000 lbs. per acre (2.24 t/ha). Surface roughening is particularly important when hydroseeding, as a roughened slope will provide some natural coverage of lime, fertilizer, and seed.

5. Legume inoculants should be used by the date indicated on the container. When dry seeding use four times the manufacturer's recommended rate and use ten times the recommended rate of inoculant when hydroseeding.

Mulching

All permanent seeding must be mulched immediately upon completion of seed application. Refer to MULCHING - Section 6.75 (ES BMP 1.75).

Maintenance of New Seedings

Irrigation: New seedings should be supplied with adequate moisture. Supply water as needed, especially late in the season, in abnormally hot or dry weather, or on adverse sites. Water application rates should be controlled to prevent runoff. Inadequate amounts of water may be more harmful than no water.

Re-seeding: Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible.

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

2. If a stand has less than 40% cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results. NOTE: if vegetation has failed to grow, soil must be tested to determine if acidity or nutrient imbalances are responsible.

Fertilization: Seedlings should be fertilized one year after planting to insure proper stand density.

1. To established all-grass stands, apply 500 lbs./acre of 10-20-10 (12 lbs./1000 ft^2)(560 kg/ha) between August 15 and November 15. (The first fall following seeding.)

2. To legume-and-grass stands or pure legume stands, apply 500 lbs./acre of 0-20-20 (12 lbs./1000 ft^2)(560 kg/ha) in early May or between August 15-October 15.

GENERALLY, A STAND OF VEGETATION CANNOT BE DETERMINED TO BE FULLY ESTABLISHED UNTIL SOIL COVER HAS BEEN MAINTAINED FOR ONE FULL YEAR FROM PLANTING. DISTURBED AREAS WHICH ARE TO BE STABILIZED WITH PERMANENT VEGETATION MUST BE SEEDED OR PLANTED WITHIN 15 DAYS AFTER FINAL GRADE IS REACHED UNLESS TEMPORARY STABILIZATION IS APPLIED.

Lime and Fertilizer

Lime and fertilizer needs should be determined by soil tests. Soil tests may be performed by the Cooperative Extension Service Soil Testing Laboratory at the U.F., or by a reputable commercial laboratory. Information concerning the State Soil Testing Laboratory is available from county extension agents. Under unusual conditions where it is not possible to obtain a soil test, the following soil amendments will be applied:

LIME: 2 tons/acre finely ground agricultural or dolomitic limestone (90 lbs./1000 ft^2)(4.48 t/ha)

FERTILIZER: Mixed grasses and legumes: 1000 lbs./acre 5-20-10 (25 lbs./1000 ft^2)(1.12 t/ha)

Legume stands only: 1000 lbs./acre 5-20-10 (25 lbs./1000 ft^2)(1.12 t/ha)

Grass stands only: 1000 lbs./acre 5-20-10 (1.12 t/ha) and 300 lbs.of38-0-0 in spring (7 lbs./1000 ft^2)(336 kg/ha)

1000 lbs./acre 10-20-10 (1.12 t/ha) and 300 lbs. of 38-0-0 in fall (7 lbs./1000 ft^2)(336 kg/ha)

Other fertilizer formulations may be used, provided they can supply the same amounts and proportions of plant nutrients.

Incorporation - Lime and fertilizer shall be incorporated into the top 4 - 6 inches (10 - 15 cm) of the soil by discing or other means. When applying lime and fertilizer with a hydroseeder, apply to a rough, loose surface.

Seeding

1. Certified seed should be used for all permanent seeding whenever possible.

2. Legume seed - Legume seed should be inoculated with the inoculant appropriate to the species. Seed of lespendezas, crown vetch, and clovers should be scarified to promote uniform germination.

3. Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder, or hydroseeder on a firm, friable seedbed. Maximum seeding depth should be 1/4 inch.

4. Hydroseeding - To avoid seed damage, it is recommended that if a machinery breakdown of 30 minutes to 2 hours occurs, 50% more seed be added to the tank, based on the proportion of the slurry remaining in the tank. Beyond 2 hours, a full rate of new seed may be necessary.

Often hydroseeding contractors prefer not to apply lime in their rigs as it is abrasive. In inaccessible areas, lime may have to be applied in pelletized or liquid form,

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6.75 MULCHING (ES BMP 1.75)

Definition

Application of plant residues or other suitable materials to the soil surface.

Purposes

1. To prevent erosion by protecting the soil surface from raindrop impact and reducing the velocity of overland flow.

2. To foster the growth of vegetation by increasing available moisture and providing insulation against extreme heat and cold.

Conditions Where Practice Applies

1. Areas which have been permanently seeded should be mulched immediately following seeding.

2. Areas which cannot be seeded because of the season should be mulched to provide temporary protection to the soil surface. An organic mulch (not wood fiber alone) shall be used, and the area then seeded as soon as feasible in spring.

3. Mulch shall be used together with plantings of trees, shrubs, or certain ground covers which do not provide adequate soil stabilization by themselves.

4. Mulch shall be used in conjunction with temporary seeding operations specified in TEMPORARY SEEDING - Section 6.65 (ES BMP 1.65).

5. Mulches used in areas of concentrated flows or frequent inundation shall be properly anchored to prevent them from floating away.

Specifications

Types of Mulches

1. Organic Mulches

Organic mulches may be used in any area where mulch is required, subject to the restrictions noted in Table 6.75a. Select mulch material based on site requirements, availability of materials, and availability of labor and equipment. Table 6.75a lists the most commonly used organic mulches. Other materials, such as peanut hulls and cotton burs, may be used.

Mulch materials shall be spread uniformly, by hand or machine. When spreading straw by hand, divide the area to be mulched into approximately 1000 sq. ft. sections and place 70 - 90 lbs. (1-1/2 to 2 bales)(30 - 40 kg) of straw in each section

to facilitate uniform distribution.

2. Nets , Mats, and Blankets

Nets may be used alone on level areas, on slopes no steeper than 3:1, and in waterways as specified in STORMWATER CONVEYANCE CHANNELS - Section 5.35 (ES BMP 1.35). When mulching is done in late fall or during June, July, or August, or where soil is highly erodible, net should only be used in conjunction with an organic mulch such as straw. When net and organic mulch are used together, the net should be installed over the mulch except when the mulch is wood fiber. Wood fiber may be sprayed on top of the installed net. Excelsior binders are considered protective mulches and may be used alone on erodible soils and during all times of year.

Table 6.75a - Mulch Application

Mulches	Rate per acre	Rate per 1000 sq.ft.	Notes
Straw	1.5 - 2 tons	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Wood Fibers	0.5 - 1.0 tons	25 - 50 lbs.	Fibers 1.5" min. length. Do not use alone in winter or during hot, dry weather. Apply as slurry.
Corn Stalks	4 - 6 tons	185 - 275 lbs.	Cut or shredded in 4 - 6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 - 6 tons	185 -275 lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Shredded Bark Chips	50 - 70 cu. yds.	1 - 2 cu. yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

Table 6.75a Organic Mulch Materials and Application Rates
Source: Virginia SWCC

Jute net shall be heavy, uniform cloth woven of single jute yarn, which if 36 to 48 inches (90 to 120 cm) wide shall weigh an average of 1.2 pounds per linear yard (0.6 kg/m). Other products designed to control erosion shall conform to manufacturer's specification and should be applied in accordance with manufacturer's instructions provided those instructions are at least as stringent as

this specification. Examples of these products are Erosionet, Holdgro, Weedchek, and Curlex. (Use of trade names does not constitute an endorsement of products by FDEP). In no case shall these products cover less than 30% of the soil surface

3. Chemical Mulches

Chemical mulches may be used alone only in the following situations:

a. Where no other mulching material is available.

b. In conjunction with temporary seeding during the times when mulch is not required for that practice.

c. From May 1 to June 15 and September 15 to October 15, provided that they are used on areas with slopes no steeper than 4:1, which have been roughened in accordance with SURFACE ROUGHENING - Section 6.60 (ES BMP 1.60).

Prior to installation:

1. Shape and grade as require the waterway, channel, slope, or other area to be protected.

2. Remove all rocks, clods, or debris larger than 2 inches in diameter that will prevent contact between the net and the soil surface.

3. Lime and fertilizer should be incorporated and surface roughening accomplished as needed. Seed should be applied prior to mulching except in the following cases:

a. Where seed is to be applied as part of a hydroseeder slurry containing wood fiber mulch.

b. Where seed is to be applied following a straw mulch spread during winter months.

c. Where a hydroseeder slurry is applied over straw.

Mulch Anchoring: Straw mulch must be anchored immediately after spreading to prevent windblow. Other organic mulches listed in Table 6.75a do not require anchoring. The following methods of anchoring straw may be used:

1. Mulch anchoring tool: This is a tractor-drawn implement designed to punch mulch into the soil surface. This method provides maximum erosion control with straw. It is limited to use on slopes no steeper than 3:1, where equipment can operate safely. Machinery shall be operated on the contour.

2. Liquid mulch binders: Application of liquid mulch binders and tackifiers should be heaviest at edges of areas and at crests of ridges and banks, to prevent windblow. The remainder of the area should have binder applied uniformly. Binders may be applied after mulch is spread or may be sprayed into the mulch as it is being blown onto the soil. Applying straw and binder together is the most effective method.

Chemical binders such as Petroset, Terratack, Road Oyl, and Aerospray may be used as recommended by the manufacturer to anchor mulch. These are expensive and therefore usually used in small areas or in residential areas where asphalt may be a problem. (Use of trade names does not constitute an endorsement by FDEP).

3. Mulch nettings - Lightweight plastic, cotton, or paper nets may be stapled over the mulch. Netting shall be secured by stakes, staples, or pins according to manufacturer's recommendations. See Plate 6.75g for details.

4. Peg and Twine - Because it is labor intensive, this method is feasible only in small areas where other methods cannot be used. Drive 8 - 10 inch (20 -25 cm) wooden pegs to within 3 inches (8 cm) of the soil surface, every 4 feet (1.2 m) in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square pattern. Turn twine 2 or more times around each peg.

Laying Nets, Mats, and Blankets

Nets, mats, and blankets should be installed according to the manufacturers' instructions, provided that they are at least as stringent as the general recommendations below.

1. Start laying net from top of channel or top of slope and unroll downgrade.

2. Allow to lay loosely on soil--do not stretch.

3. **To secure net:** Upslope ends of net should be buried in a slot or trench no less than 6 inches (15 cm) deep. Tamp earth firmly over net. Staple the net every 12 inches (30 cm) across the top end. Edges of net shall be stapled every 3 feet (90 cm). Where 2 strips of net are laid side by side, the adjacent edges shall be overlapped 3 inches (8 cm) and stapled together. Staples shall be placed down the center of net strips at 3-foot (90 cm) intervals. DO NOT STRETCH net when applying staples.

4. **Joining strips:** Insert new roll of net in trench, as with upslope ends of net. Overlap the end of the previous roll 18 inches (45 cm), turn under 6 inches (15 cm), and staple across end of roll just below anchor slot and at the end of the turned-under net every 12 inches (30 cm).

5. **At bottom of slopes**: Lead net out onto a level area before anchoring. Turn ends under 6 inches (15 cm), and staple across end every 12 inches (30 cm).

6. **Check slots**: On highly erodible soils and on slopes steeper than 4:1, erosion check slots should be made every 15 feet (4.5 m). Insert a fold of net into a 6-inch (15 cm) trench and tamp firmly. Staple at 12-inch (30 cm) intervals across the downstream portion of the net.

7. After installation, stapling, and seeding, net should be rolled to insure firm contact between net and soil.

Maintenance

All mulches should be inspected periodically, in particular after rainstorms, to check for rill erosion. Where erosion is observed additional mulch should be applied. Net should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, re-install net as necessary after repairing damage to the slope. Inspections should take place up until grasses are firmly established. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface. Repair as needed.

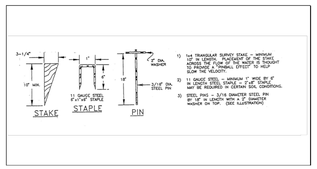
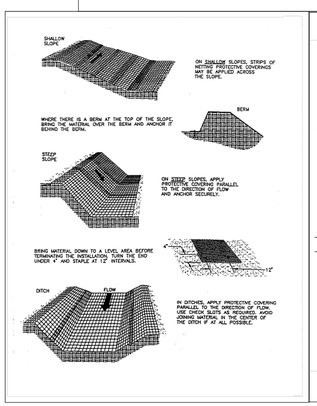
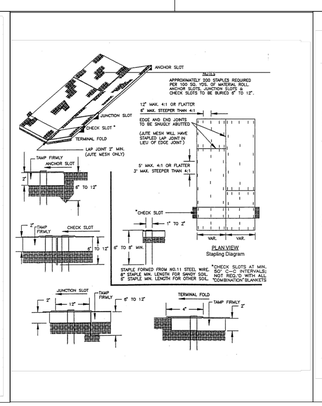
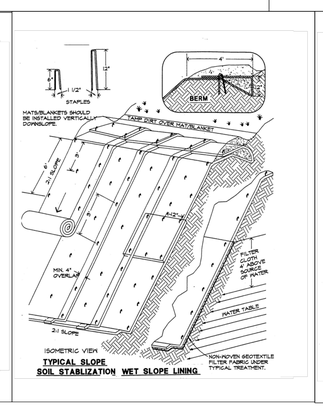
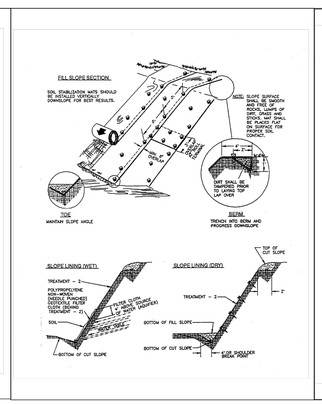


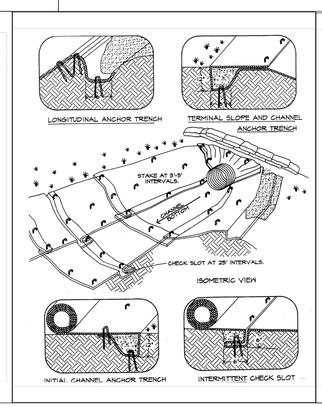
Plate 6.75g Stakes, Staples, and Pins for Installation Soil Stabilization Matting
Source: Product Literature from Greenstreak, Inc.

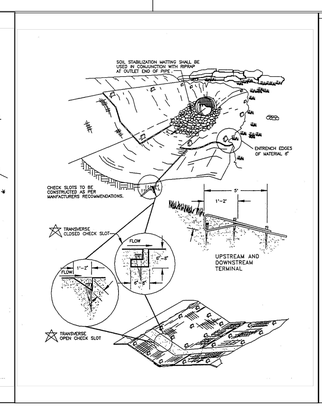


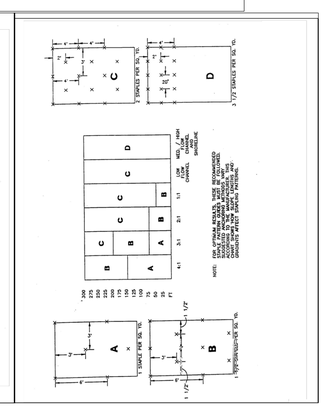












M MULCHING NTS

PANDA EXPRESS, INC.
1683 WALNUT GROVE AVE.
ROSEMEAD, CALIFORNIA 91770
TELEPHONE: 626.799.9898
FACSIMILE: 626.372.8288

REVISIONS:

C1	1ST COUNTY COMMENTS	04/05/2021
C2	2ND COUNTY COMMENTS	06/04/2021

ISSUE DATE:

	ALT. STANDARDS	12/17/2020
	PRELIMINARY SITE PLAN	01/12/2021
	COUNTY COMMENTS	04/05/2021
	ISSUE FOR BID	06/04/2021

DRAWN BY: INGENIUM

PANDA PROJECT #: D8135
PANDA STORE #:
ARCH PROJECT #:

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