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Erosion and Sediment Control for Earth Moving Activities

When is an Erosion and Sedimentation (E&S) plan required?

Any earth disturbance is required to protect the site from accelerated erosion through the use of Best Management Practices (BMPs). Some of these BMPs include, but are not limited to such things as filter fabric fence (silt fence), rock filters, stabilized entrances to the site, grass buffers, diversion of upslope water, and seeding and mulching of disturbed areas.

Any disturbance over 5,000 square feet requires a written E&S plan to be developed and kept on site. Most construction generally that takes place disturbs more than 5,000 sq. ft whether it is building a garage or putting in a driveway.

Additional permits may be required if the earth disturbance is 1 acre (43,560 sq. ft) or larger over the life of the project. Contact the Lycoming County Conservation District for regulations and guidance.

An E&S plan minimizes sediment runoff from an earthmoving activity. This in turn reduces sediment polluting nearby waterways and water bodies.

The implementation and maintenance of erosion and sediment control BMP's (best management practices) are required to minimize the potential for accelerated erosion and sedimentation, including those activities which disturb less than 5,000 square feet. This means that regardless if a plan is reviewed by the conservation district, best management practices (E&S controls) must be in place, operating properly, and maintained throughout the life of the project.

What does an E&S Plan consist of?

- E&S Plans outline BMPs used to minimize erosion problems associated with earthmoving activities.
- A complete plan may include:
 - Topographical maps
 - Project site sketches
 - Details for E&S Controls
 - Soils maps
 - Narrative description of the project

Please print: Complete all spaces in the application. If there are questions, please contact the Lycoming County Conservation District for assistance.

Landowner Name: _____

Mailing Address: _____

City/State/Zip Code: _____

Email/Phone Number: _____

Excavator Name: _____

Mailing Address: _____

City/State/Zip Code: _____

Email/Phone Number: _____

Project location: _____ (municipality, city, borough, township)

Estimated dates for start and completion of project:

Start date: _____ End date: _____

Total project (acres): _____ **Disturbed acres:** _____

Has the municipality been contact? _____

Is the earth disturbance within a floodway or 50 ft from a stream or waterway?

Yes _____ No _____

Name of watershed or nearest receiving stream in which the project is proposed:

Please provide specific directions to project location. Include distances, landmarks, or special features. Also attach a map if possible.

Briefly describe the project:

Total amount of disturbed area:

*******This plan is only applicable to disturbance less than 1 acre*****
1 acre or larger must obtain a NPDES**

Below is an example of items in a new home construction, relabel to meet your project

	Total length	X	Total width	= Area (sq. ft)
Access roads/Driveways:	_____	X	_____	= _____
Foundation/Building:	_____	X	_____	= _____
Lawn/Landscaping:	_____	X	_____	= _____
Other:	_____	X	_____	= _____

Total area = _____ sq. ft.

Total area _____ sq ft ÷ 43,560 = _____ Disturbed acres

Are steep slopes in excess of 10% within your project boundaries, or in the immediate surrounding areas? **If over 8%, erosion control straw blanketing netting is recommended on all slopes

Yes _____ No _____

Does off-site drainage exist? Yes _____ No _____

Type of offsite drainage: _____

Will the project increase runoff from the site? Yes _____ No _____

Are you aware of a discharge to surface waters of the Commonwealth or existing offsite drainage which may occur from this construction site? (Ex. Road way ditch that leads to stream)

Yes _____ No _____

Soil Type: List the type(s) of soil found on the property and include a map of soil locations and a topographic map. (Soils maps are available at <http://websoilsurvey.nrcs.usda.gov/app/> or contact the Lycoming County Conservation District):

Soils limitations and how they will be addressed: Include additional sheets if needed:

Sequence of Construction: Be specific and provide steps from beginning of work to the end. Attach additional sheets if needed.

Temporary Best Management Practices: This section details what temporary BMPs will be utilized during the project. Check each control that will be used.

- | | |
|---|--|
| <input type="checkbox"/> Rock Construction Entrance | <input type="checkbox"/> Temporary Seeding |
| <input type="checkbox"/> Filter Fabric Fence (Silt fence) | <input type="checkbox"/> Mulching |
| <input type="checkbox"/> Straw Bale Barrier | <input type="checkbox"/> Channel lining / Bank Slope (netting) |
| <input type="checkbox"/> Rock filters | <input type="checkbox"/> Diverting upslope water |
| <input type="checkbox"/> Rock outlet protection | <input type="checkbox"/> Compost filter Sock (Recommend 12" or larger) |
| <input type="checkbox"/> Sediment trap | <input type="checkbox"/> Other |
| <input type="checkbox"/> Inlet protection | <input type="checkbox"/> Other |

Check: (X, √)

All items checked above will be to DEP specifications.

Alternative controls will be maintained as per manufacturer's specifications and are attached.

Permanent Best Management Practices:

Prior to the completion of the project, state law requires that completion of any stage or phase of the earth disturbance activity requires immediate seeding, mulching or other protection from accelerated erosion and sedimentation. Implementation and maintenance of BMP's (Best Management Practices) are required until the completion of permanent stabilization of the disturbed area. Types of permanent stabilization include:

(1) uniform 70% perennial vegetative cover, with density capable of resisting erosion or (2) other acceptable BMPs that permanently minimize accelerated erosion and sedimentation.

All disturbed areas must be protected to prevent accelerated erosion. In other words, soil cannot be left exposed. Revegetating an area should include the seeding mixture that will be used. Please provide how the site will be stabilized (i.e. vegetation, stone, pavement, etc.).

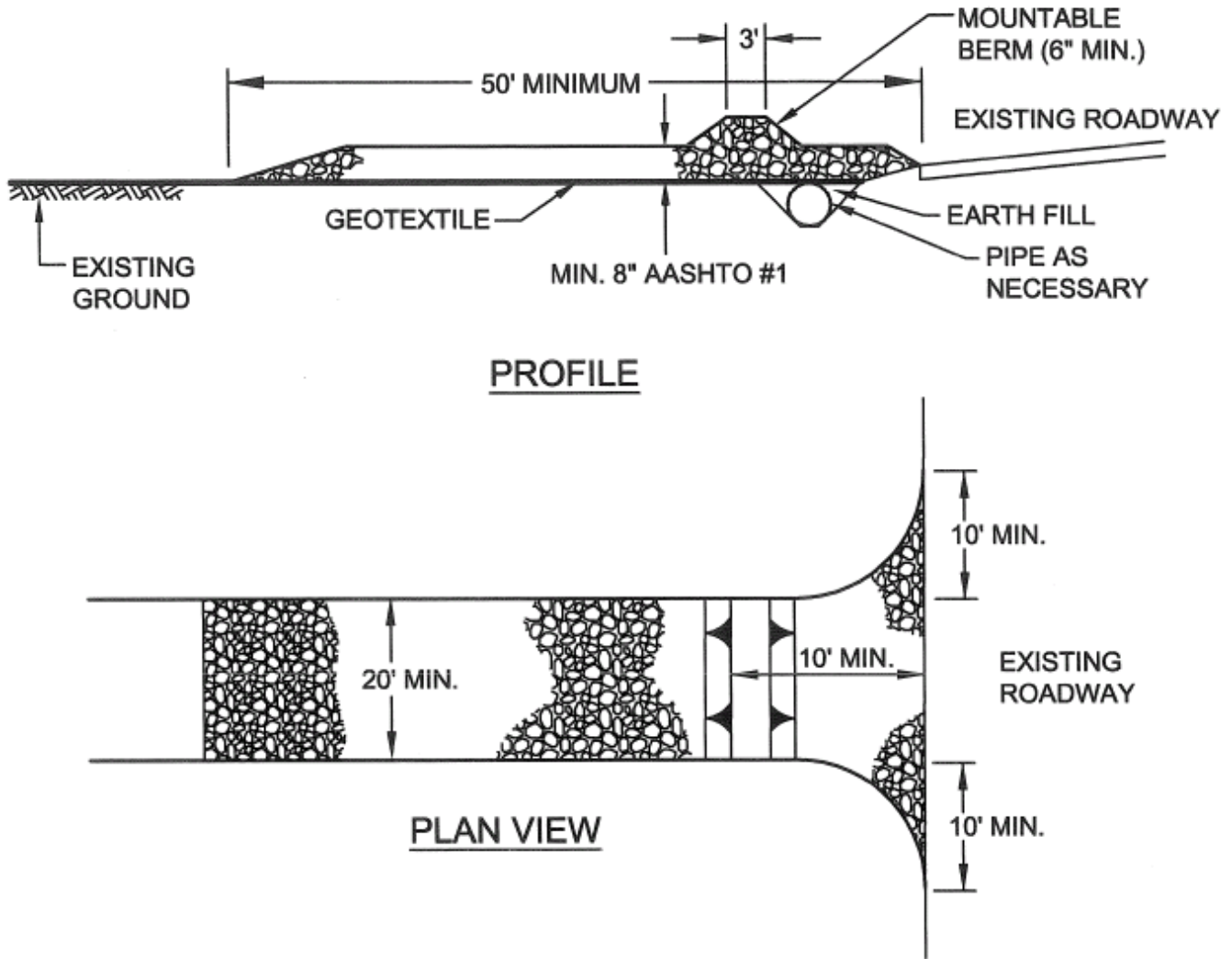
Maintenance Program: All erosion control practices require maintenance to function properly. Please note the following required maintenance procedures and check other applicable procedures for control measures you will be using.

Until the site is stabilized, all erosion controls must remain in place and be maintained properly. Maintenance must include weekly inspections and inspections after each runoff event. All preventative and remedial maintenance work, including clean out, repair, and replacement must be done immediately.

After final stabilization has been achieved temporary erosion and sedimentation controls may be removed. Any disturbance created by the removal of these controls shall be stabilized. Stabilization is a uniform 70% vegetative cover or another type of type of cover that prevents accelerated erosion from the site (i.e. stone, pavement, etc.)

Sketch Plan: Please provide a sketch of the project showing the location of all BMPs. Direction of slope should be indicated as well as the entire project and surrounding areas. (Use back of the sheet or additional sheets if necessary.)

Rock Construction Entrance



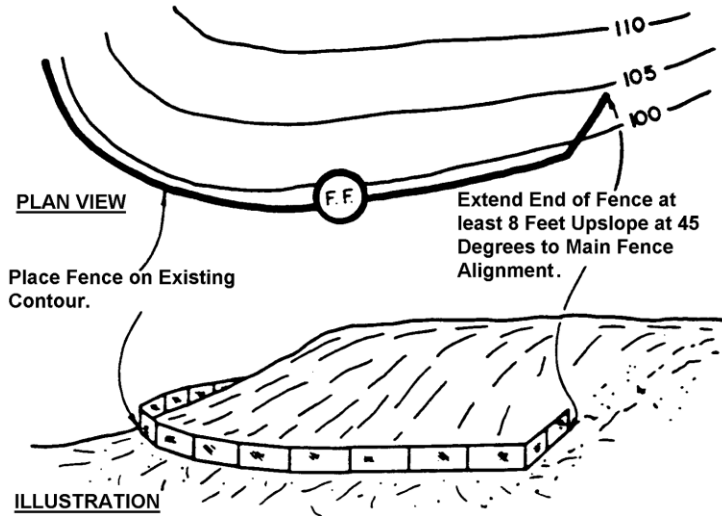
Topsoil should be removed prior to installation of rock construction entrance.

Runoff shall be diverted from roadway to a suitable sediment removal BMP prior to entering Rock Construction Entrance.

Mountable berm should be installed wherever optional culvert pipe is used. Pipe to be sized appropriately for size of ditch being crossed.

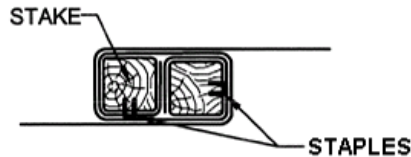
MAINTENANCE: Rock Construction Entrance thickness shall be constantly maintained to the specified dimensions by adding rock. A stockpile shall be maintained on site for this purpose. All sediment deposited on paved roadways shall be removed and returned to the construction site immediately. If excessive amounts of sediment are being deposited on roadway, extend length of rock construction entrance by 50 feet increments until condition is alleviated or install wash rack. Washing the roadway or sweeping the deposits into roadway ditches, sewer, culverts, or other drainage ways is not acceptable.

Sediment Barrier Alignment

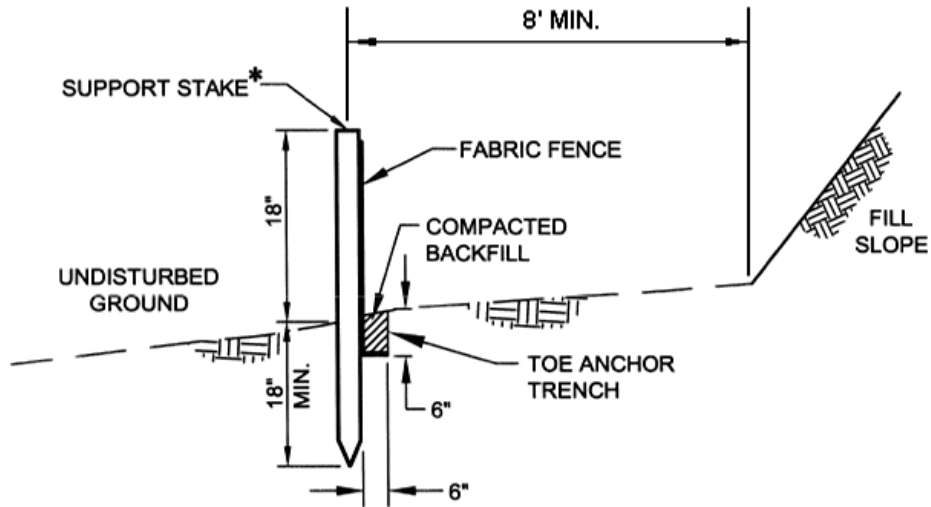


Standard Silt Fence (18" High)

*STAKES SPACED @ 8' MAX.
USE 2" x 2" (± 3/8") WOOD
OR EQUIVALENT STEEL
(U OR T) STAKES



JOINING FENCE SECTIONS



ELEVATION VIEW

Fabric shall be 30" minimum.

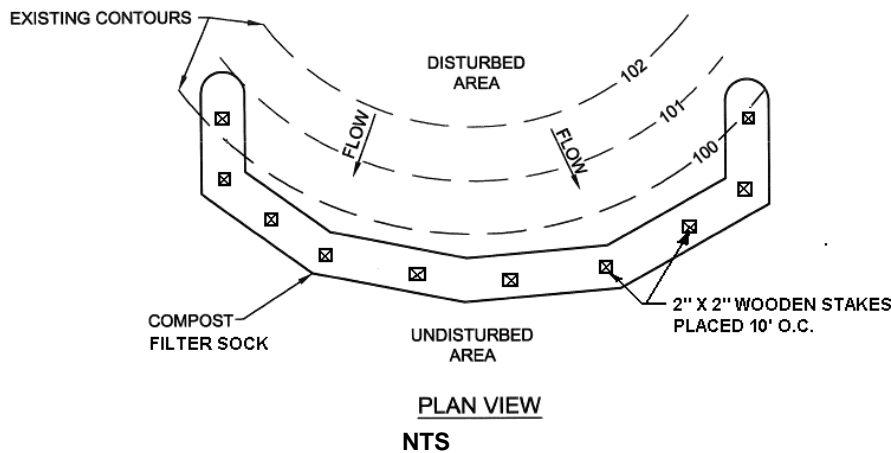
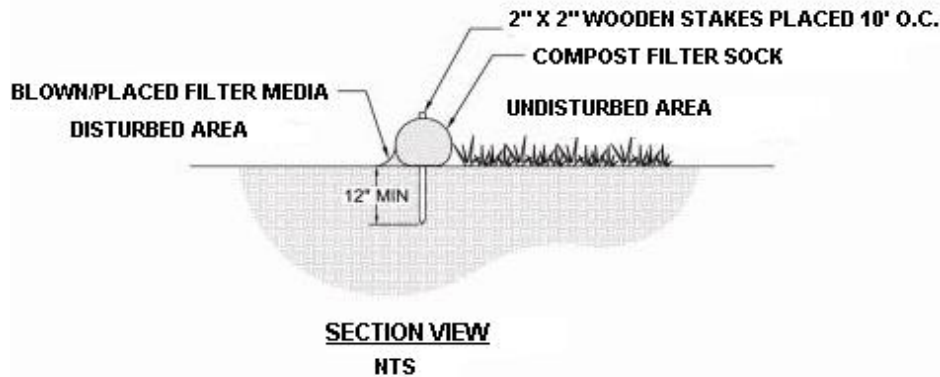
-Silt Fence must be placed at level existing grade. Both ends of the barrier must be extended at least 8 feet up slope at 45 degrees to the main barrier alignment.

-Sediment must be removed when accumulations reach 1/2 the above ground height of the fence.

-Any section of Silt Fence which has been undermined or topped must be immediately replaced with a Rock Filter Outlet. See standard detail below.

-Fence shall be removed and properly disposed of when tributary area is permanently stabilized.

COMPOST FILTER SOCK



Adapted from Filtrexx

Compost Filter Sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 8 feet up slope at 45 degrees to the main sock alignment (see Figure 4.1). Maximum slope length above any sock shall not exceed that shown on Figure 4.2.

Traffic shall not be permitted to cross filter socks.

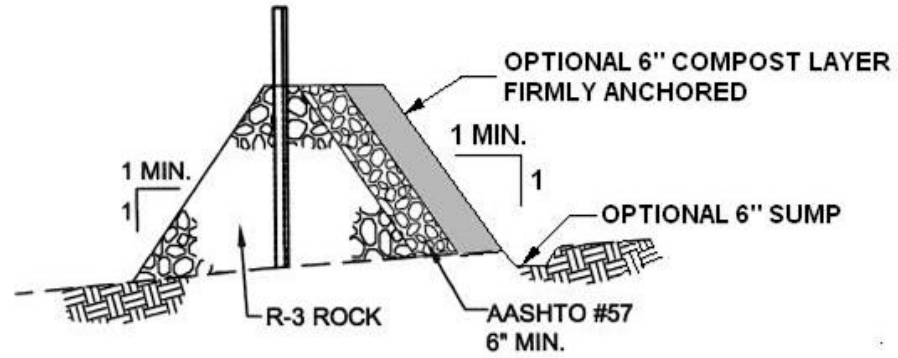
Accumulated Sediment shall be removed when it reaches $\frac{1}{2}$ the above ground height of the sock and disposed in the manner described elsewhere in the plan.

Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.

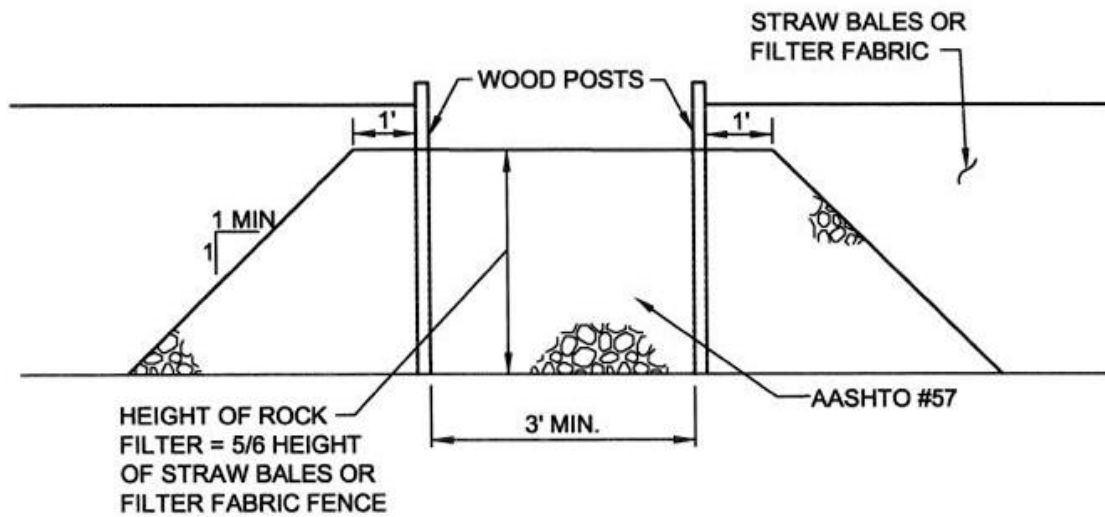
Biodegradable filter sock shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be replaced according to manufacturer's recommendations.

Upon stabilization of the area tributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement

Rock Filter Outlet



OUTLET CROSS-SECTION

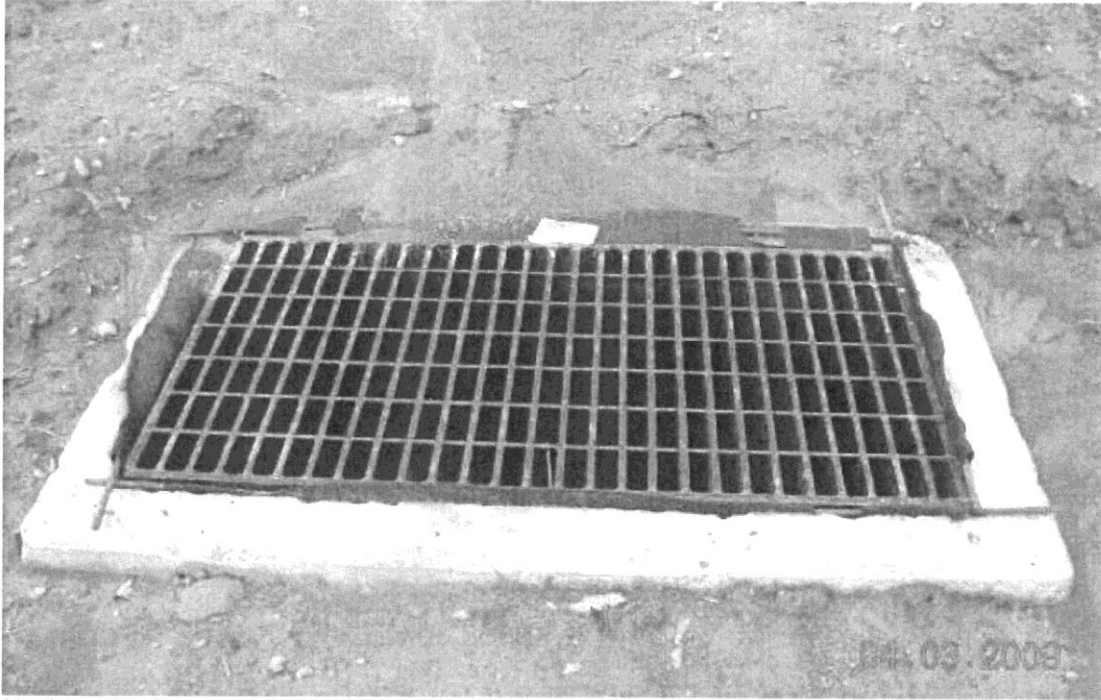


UP-SLOPE FACE

A Rock Filter Outlet shall be installed where failure of a Straw Bale Barrier or Filter Fabric Fence has occurred due to concentrated flow.

Sediment must be removed when accumulations reach 1/3 the height of the outlet.

INLET FILTER BAG - Sediment Removal Efficiency: MODERATE. This device is an ABACT for HQ but not EV watersheds. Filter bags should be capable of trapping all particles not passing a No.40 Sieve.



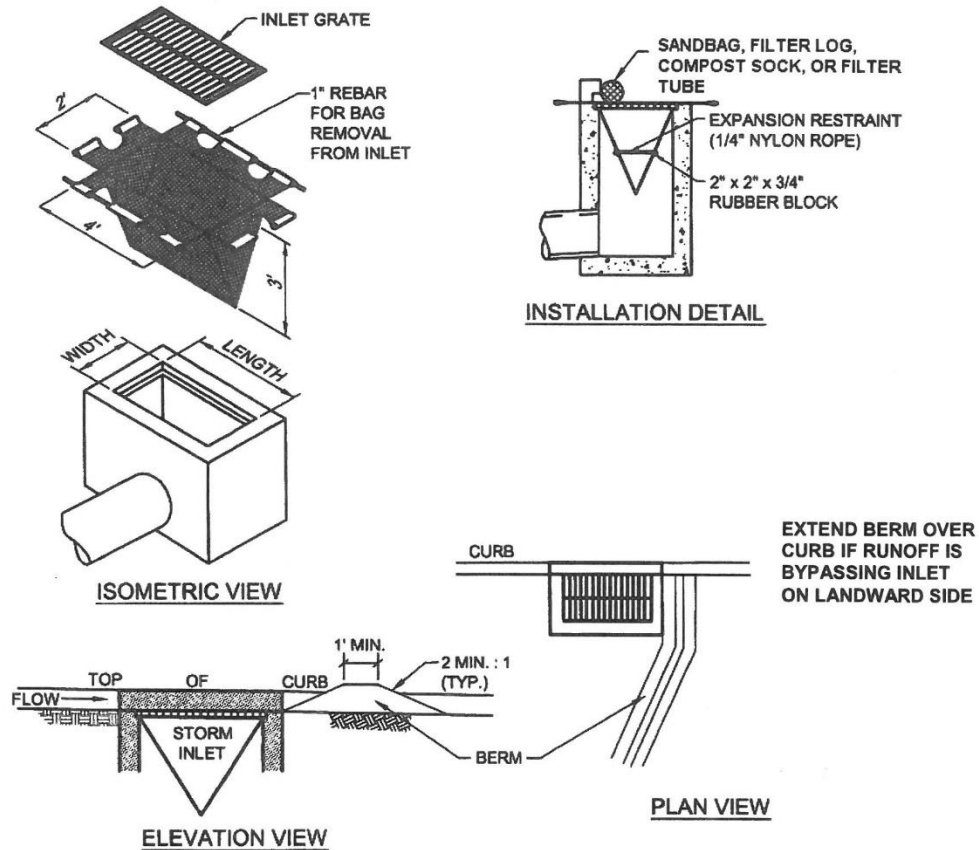
Northampton Conservation District

Wherever filter bags are used they should be installed according to the manufacturer's specifications. Typical installation details should be provided on the drawings. Standard Construction Details # 4-15 and # 4-16 are recommended. NOTE: Filter bags designed to fit over the inlet grate are not recommended for most storm sewer inlets. Use of such filter bags could result in a severe reduction of the inlet capacity resulting in flooding or runoff bypassing the inlet. Wherever such bags are used, they should be located at topographic low points and limited to ¼ acre maximum drainage areas. Inlet filter bags are not acceptable as the primary BMP to remove sediment from site runoff water.

Inlet filter bags should be inspected on a weekly basis and after each runoff event. Filter bags should be cleaned and/or replaced when the bag is half full or when flow capacity has been reduced so as to cause flooding or bypassing of the inlet. Accumulated sediment should be disposed in the approved manner. Bags that will be reused should be rinsed at a location where the rinse water will enter a sediment trap or sediment basin. Damaged filter bags should be replaced.

Needed repairs should be initiated immediately after the inspection.

**STANDARD CONSTRUCTION DETAIL # 4-15
Filter Bag Inlet Protection - Type C Inlet**



Adapted from PennDOT RC-70, 2008 Edition

Maximum drainage area = 1/2 acre.

Inlet protection shall not be required for inlet tributary to sediment basin or trap. Berms shall be required for all installations.

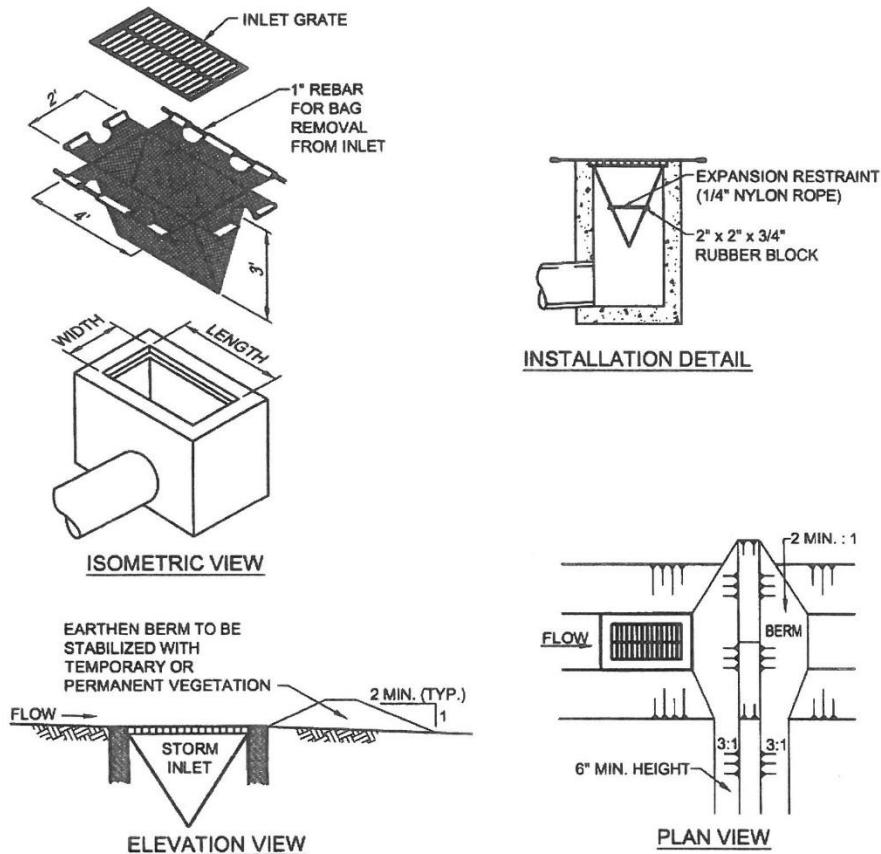
Rolled earthen berm shall be maintained until roadway is stoned. Road subbase berm shall be maintained until roadway is paved. Six inch minimum height asphalt berm shall be maintained until roadway surface receives final coat.

At a minimum, the fabric shall have a minimum grab tensile strength of 120 lbs, a minimum burst strength of 200 psi, and a minimum trapezoidal tear strength of 50 lbs. Filter bags shall be capable of trapping all particles not passing a No. 40 Sieve.

Inlet filter bags shall be inspected on a weekly basis and after each runoff event. Bags shall be emptied and rinsed or replaced when half full or when flow capacity has been reduced so as to cause flooding or bypassing of the inlet. Damaged or clogged bags shall be replaced. A supply shall be maintained on site for replacement of bags. All needed repairs shall be initiated immediately after the inspection. Dispose of accumulated sediment as well as all used bags according to the plan notes.

DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

**STANDARD CONSTRUCTION DETAIL # 4-16
Filter Bag Inlet Protection - Type M Inlet**



Adapted from PennDOT RC-70, 2008 Edition

Maximum drainage area = 1/2 acre.

Inlet protection shall not be required for inlet tributary to sediment basin or trap. Berms shall be required for all installations.

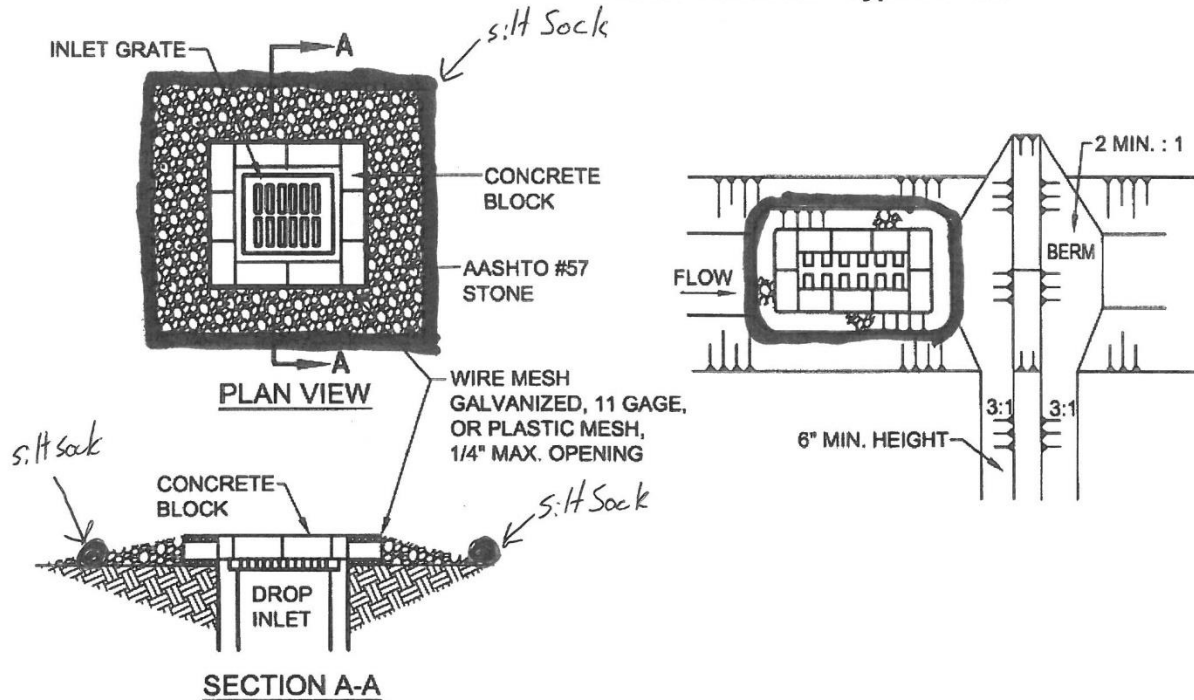
Rolled earthen berm in roadway shall be maintained until roadway is stoned. Road subbase berm on roadway shall be maintained until roadway is paved. Earthen berm in channel shall be maintained until permanent stabilization is completed or remain permanently.

At a minimum, the fabric shall have a minimum grab tensile strength of 120 lbs., a minimum burst strength of 200 psi, and a minimum trapezoidal tear strength of 50 lbs. Filter bags shall be capable of trapping all particles not passing a No. 40 sieve.

Inlet filter bags shall be inspected on a weekly basis and after each runoff event. Bags shall be emptied and rinsed or replaced when half full or when flow capacity has been reduced so as to cause flooding or bypassing of the inlet. Damaged or clogged bags shall be replaced. A supply shall be maintained on site for replacement of bags. All needed repairs shall be initiated immediately after the inspection. Dispose accumulated sediment as well as all used bags according to the plan notes.

DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL # 4-18
Stone and Concrete Block Inlet Protection - Type M Inlet



Adapted from Maine DEP

Maximum drainage area =1 acre.

Inlet protection shall not be required for inlet tributary to sediment basin or trap. Berms shall be required for all installations not located at a low point.

Rolled earthen berm in roadway shall be provided and maintained immediately down gradient of the protected inlet until roadway is stoned. Road subbase berm on roadway shall be maintained until roadway is paved. Earthen berm in channel shall be maintained until permanent stabilization is completed or to remain permanently.

Top of block shall be at least 6 inches below adjacent roads if ponded water would pose a safety hazard to traffic.

Sediment shall be removed when it reaches half the height of the stone. Damaged or clogged installations shall be repaired or replaced immediately.

For systems discharging to HQ or EV surface water, a 6 inch thick compost layer shall be securely anchored on outside and over top of stone. Compost shall meet the standards in Table 4.2.

Seeding and Mulching:

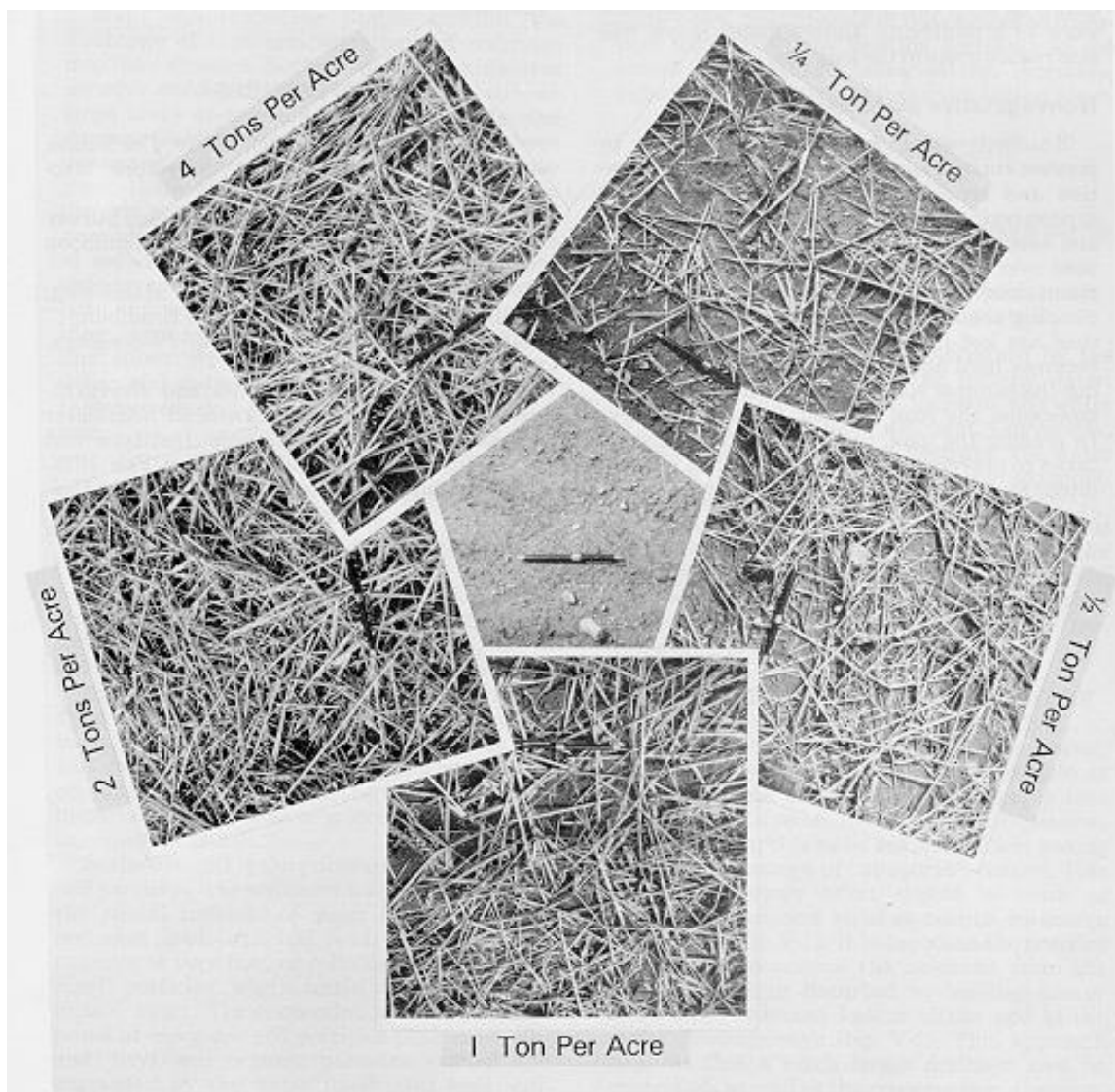
Recommended Seed Mixtures

Species	Seeding Rate - Pure Live Seed ¹	
	Most Sites	Adverse Sites
Spring oats (spring), or 64 96	64 10	96 15
Annual ryegrass (spring or fall), or Winter wheat (fall), or Winter rye (fall)	90 56	120 112
Tall fescue, or 75	60	75
Fine fescue, or 40	35	40
Kentucky bluegrass, plus 25 30	25 3	30 3
Redtop ⁴ , or Perennial ryegrass	15	20
Birdsfoot trefoil, plus 6 10	6 30	10 35
Tall fescue		
Birdsfoot trefoil, plus	6	10
Reed canarygrass	10	15
Crownvetch, plus	10	15
Tall fescue, or	20	25
Perennial ryegrass	20	25
Crownvetch, plus	10	15
Annual ryegrass	20	25
Birdsfoot trefoil, plus	6	10
Crownvetch, plus	10	15
Tall fescue	20	30
Flatpea, plus	20	30
Tall fescue, or	20	30
Perennial ryegrass	20	25
Serecia lespedeza, plus	10	20
Tall fescue, plus	20	25
Redtop ⁴	3	3
Tall fescue, plus	40	60
Fine fescue	10	15
Deertongue, plus	15	20
Birdsfoot trefoil	6	10
Switchgrass, or	15	20
Big Bluestem, plus	15	20
Birdsfoot trefoil	6	10
Orchardgrass, or	20	30
Smooth brome grass, plus	25	35
Birdsfoot trefoil	6	10

Penn State, "Erosion Control & Conservation Plantings on Noncropland,"

1. Pure Live Seed (PLS) is the product of the percentage of pure seed times percentage germination divided by 100. For example, to secure the actual planting rate for switchgrass, divide 12 pounds PLS shown on the seed tag. Thus, if the PLS content of a given seedlot is 35%, divide 12 PLS by 0.35 to obtain 34.3 pounds of seed required to plant one acre. All mixtures in this table are shown in terms of PLS.
2. If high-quality seed is used, for most sites seed spring oats at a rate of 2 bushels per acre, winter wheat at 11.5 bushels per acre, and winter rye at 1 bushel per acre. If germination is below 90%, increase these suggested seeding rates by 0.5 bushel per acre.
3. This mixture is suitable for frequent mowing. Do not cut shorter than 4 inches.
4. Keep seeding rate to that recommended in table. These species have many seeds per pound are very competitive. To seed small quantities of small seeds such as weeping lovegrass and redtop, dilute with dry sawdust, sand, rice hulls, buckwheat hulls, etc.
5. Use for highway slopes and similar sites where the desired species after establishment is crownvetch.
6. Use only in extreme southeastern or extreme southwestern Pennsylvania. *Serecia lespedeza* is not well adapted to most of Pa.
7. Do not mow shorter than 9 to 10 inches.
8. Seed mixtures containing crown vetch should not be used in areas adjacent to wetlands or stream channels due to the invasive nature of this species.

Straw Mulch at Various Rates of Application



EPA-625/3-76-006

Rule of Thumb: If you are seeing bare ground, there is not enough straw.

(Caution: Too much straw can be as harmful as too little straw.)

Apply mulches at the rates shown in Table below.

Straw and hay mulch should be anchored immediately after application to prevent being windblown. A tractor-drawn implement may be used to “crimp” the straw or hay into the soil (about 3”). This method should be limited to slopes no steeper than 3H:1V. The machinery should be operated on the contour. (Note: Crimping of hay or straw by running over it with tracked machinery is not recommended.)

Mulch on slopes of 8% or steeper should be held in place with netting. Lightweight plastic, fiber, or paper nets may be stapled over the mulch according to manufacturer’s recommendations.

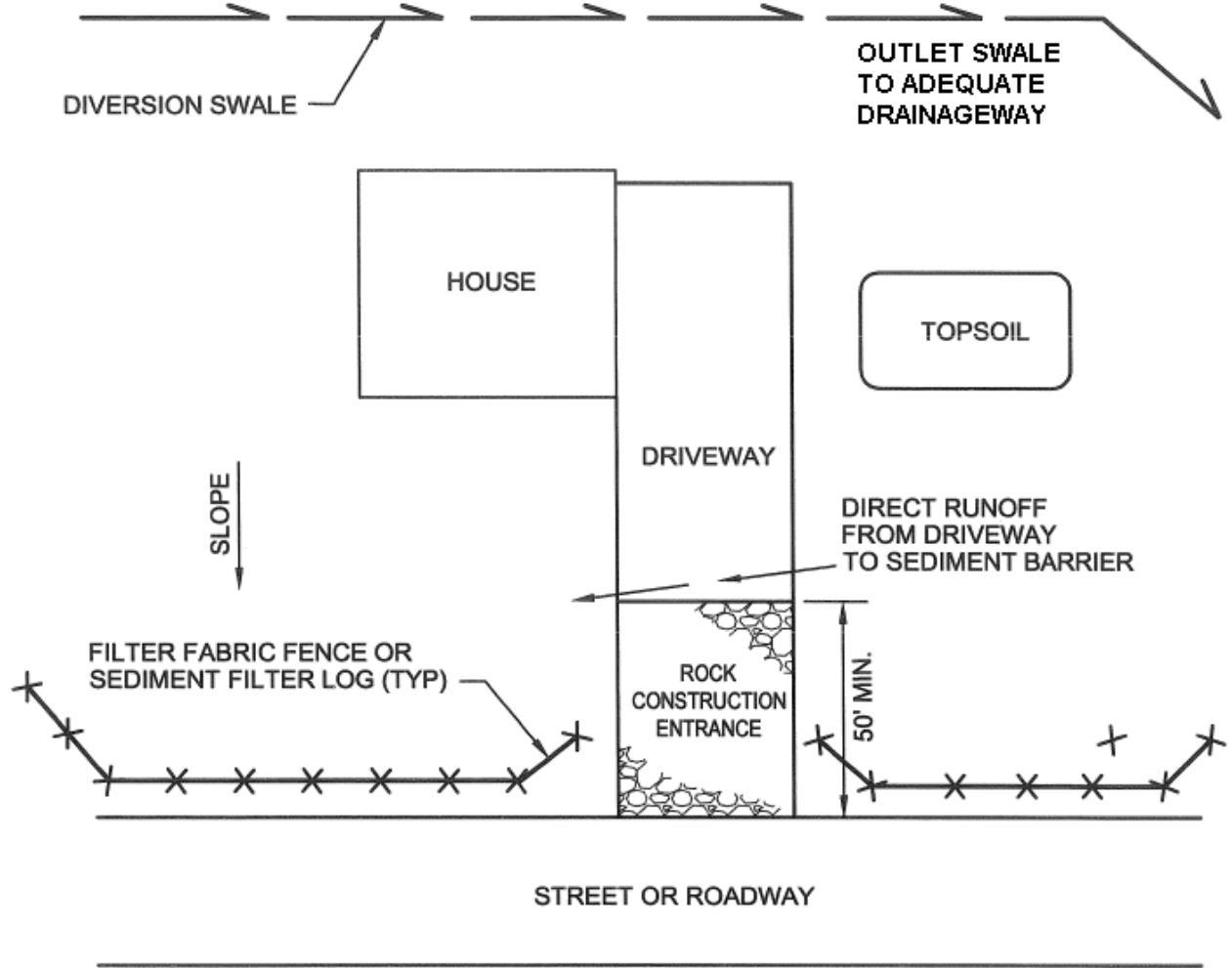
Shredded paper hydromulch should not be used on slopes steeper than 5%. Wood fiber hydromulch may be applied on steeper slopes provided a tackifier is used. The application rate for any hydromulch should be 2,000 lb/acre (min.).

Mulch Application Rates

Mulch Type	Application Rate (Min.)			Notes
	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yd.	
Straw	3 tons	140 lb.	1,240 lb.	Either wheat or oat straw, free of weeds, not chopped or finely broken
Hay	3 tons	140 lb.	1,240 lb.	Timothy, mixed clover and timothy or other native forage grasses
Wood Chips	4 - 6 tons	185 - 275 lb.	1,650 - 2,500 lb.	May prevent germination of grasses and legumes
Hydromulch	1 ton	47 lb.	415	See limitations above

MULCHING - Mulches absorb rainfall impact, increase the rate of infiltration, reduce soil moisture loss due to evaporation, moderate soil temperatures, provide a suitable environment for germination, and protect the seedling from intense sunlight. All seeded areas shall be mulched or blanketed to minimize the potential for failure to establish an adequate vegetative cover. Mulching may also be used as a temporary stabilization of disturbed areas in non-germinating seasons. Apply clean straw as a mulch at a rate of 3T/acre.

Typical On-lot BMPs for Lot above Roadway



If project is below roadway or on a side slope, BMP's should be placed down slope of earth disturbance.