



Description

Vegetative buffer strips and channels help to protect ditches and banks from erosion, increase infiltration, and remove pollutants from surface runoff providing protection to downstream receiving inlets and waterbodies.

Applications

- Any site suitable for establishment of vegetation.
- Vegetated buffer strips are appropriate for uncurbed, paved areas; steep slopes; potentially unstable slopes; and areas adjacent to sensitive waterbodies and state waters.
- Vegetated channels are appropriate for surface runoff conveyed by channels to downstream inlets or receiving waters.

Installation and Implementation Requirements

- Minimize the disturbance to existing vegetation at the site when installing a filter strip. Proper care of existing vegetation before and after construction is required. *See* section SM-17 Preservation of Existing Vegetation for more information.
- If a boundary of the disturbed area is within 50 feet of state waters, comply with 1 of the following:
 - Provide and maintain a 50-foot undisturbed natural buffer and sediment control .

Installation and Implementation Requirements *(continued)*

- Provide and maintain an undisturbed natural buffer that is less than 50 feet and double sediment control (e.g., double perimeter control) spaced a minimum of 5 feet apart.
- If it is infeasible to provide and maintain an undisturbed natural buffer of any size, provide and maintain double sediment control (e.g., perimeter control) spaced a minimum of 5 feet apart and complete stabilization within 7 calendar days of the temporary or permanent cessation of earth-disturbing activities.
- Hawaii Revised Statutes Title 13. Planning and Economic Development 205A. Coastal Zone Management defines "shoreline" as "the upper reaches of the wash of the waves at high tide during the season of the year in which the highest wash of the waves occurs, excluding storm surge or seismic action". The shoreline is considered the starting point for any buffer/filter strips employed during construction. Perimeter control BMPs must be placed according to where the shoreline has been defined.
- Vegetation must be fully established before storm water flows through the buffer. Vegetation used should be competitive with common weed species in area.
- Installation of a buffer strip with new vegetation shall comply with the following:
 - Prior to cultivation of the designated buffer strip area, remove and dispose of all weeds and debris in accordance with the following:
 - During construction, strip and stockpile good topsoil for surface preparation purposes prior to planting activities.
 - Plant the area upon completion of grading in the area.
 - Do not remove trees to create an area for vegetated filter strips.
 - Vegetated filter strips shall be sloped 5% or less. This allows the storm water to be pulled down the slope by gravity, while moving slow enough to allow sediment and pollution removal.
 - Fine grade and roll areas to be planted after cultivating soil and, if applicable, installing the irrigation system.
 - Provide additional watering or irrigation of vegetation to supplement rainfall until vegetation has been established.
 - Fertilize vegetation in accordance with manufacturer's instructions and grass/soil requirements determined by testing of the soil.



If state waters are located within 50 feet of disturbed area and an undisturbed natural buffer less than 50 feet is used, install double sediment control spaced a minimum of 5 feet apart.

Installation and Implementation Requirements *(continued)*

- Soil should not be compacted. Loosen soil and add top soil as needed before seeding.
 - Vehicular traffic passing through vegetated buffer strips or channels shall be avoided to protect vegetation from damage and maximize its effectiveness.
 - Comply with applicable regulations and manufacturer's instructions when applying fertilizers, pesticides, soil amendments, or chemicals.
 - Wider filter strips will be more effective and remove finer sediments.
 - Vegetated filter strips should be a minimum width of 5 feet.
 - Buffer strip edges should have dense growth to breakup concentrated flow.
- Seeding activities shall comply with the following:
- Add soil amendments such as fertilizer when preparing seedbed. Apply mulch after seeding to protect vegetation during establishment. Select an appropriate seed mixture based on site conditions.
 - Seed mixture should receive HDOT approval in writing prior to installation.
 - Native plants are required, but non-native plants can be used if accepted by the Engineer.
 - Dense grasses are more effective in reducing flow velocities and removing sediment. Thick root structures are necessary for erosion control.
 - Use proper equipment and methods to ensure uniform distribution and appropriate seed placement.
 - Overseed, repair bare spots, and apply additional mulch as necessary.
- Sodding activities shall comply with the following:
- Protect sod with tarps or other types of protective covering during delivery and do not allow sod to dry between harvesting and placement.
 - Restore any irregular or uneven areas observed prior to or during the plant establishment period to a smooth and even appearance.
 - Ensure ground surface is smooth and uniform prior to placing sod.
 - Areas which will be planted with sod and are adjacent to paved surfaces such as sidewalks and concrete headers, shall be 1.5 ± 0.25 inches below the top grade of the paved surface after fine grading, rolling, and settlement of the soil.
 - Stagger the ends of adjacent strips of sod a minimum of 24 inches apart.
 - Place edges and ends of sod firmly against paved borders.



Additional watering or irrigation to supplement rainfall may be needed until vegetation has been established.

Installation and Implementation Requirements *(continued)*

- Lightly roll sodded area to eliminate air pockets and ensure close contact with the soil after placement of the sod.
- Water the sodded area to moisten the soil to a depth of 4 inches after rolling.
- Do not allow sod to dry.
- Avoid planting sod during extremely hot or wet weather.
- Sod shall not be placed on slopes steeper than 3:1 (H:V) if the area will be mowed.

Considerations

- Site conditions such as availability of land.
- Flow depth and vegetative condition determine BMP effectiveness.
- May require irrigation to maintain vegetation.
- High maintenance requirements may exist depending on the design condition of the vegetation.
- Unless existing vegetation is used as a buffer strip, an area will need to be provided specifically for a buffer strip and vegetation will need to be established.
- Maintaining sheet flow in buffer strips may be difficult.
- Vegetated channels require a larger area than lined channels.
- Vegetated channels require gradual slopes since runoff with high flow velocity may flow over grass rather than through it. Buffer zones do not replace the requirement for site sediment control.
- BMP performance depends on topography and climate conditions for the specific site.

What to Inspect

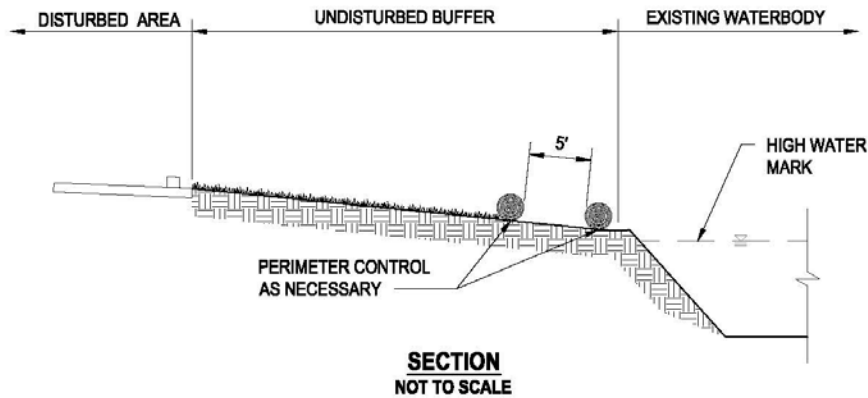
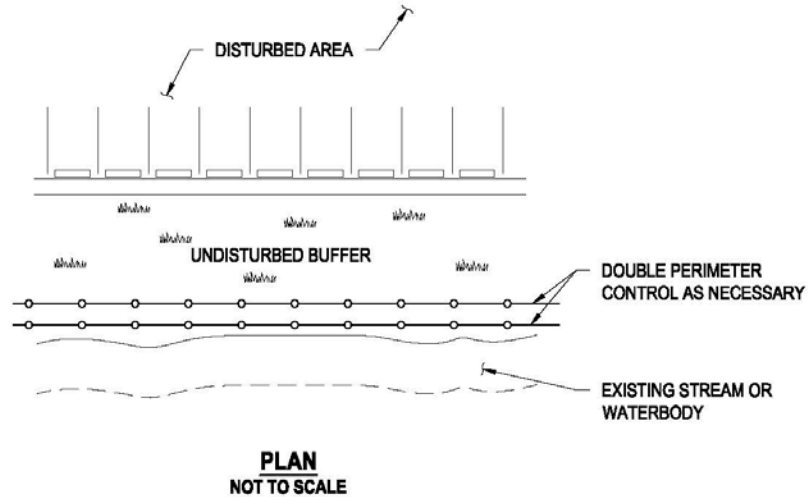
- Is there an excess amount of sediment buildup in buffer strips?
- Are buffer strips wide enough to be effective?
- Are rills and gullies formed from runoff?
- Is unwanted vegetation growth observed?
- Are vegetated filter strips fully established prior to receiving flow?
- Have native grasses/plants been planted?

Maintenance

- Maintenance activities include mowing, weeding, and verification of properly operating irrigation system, if applicable.
- Properly remove and dispose of clippings from mowing and trimming.
- When installed correctly, filter strips require minimal maintenance.
- Unwanted growth should be removed without disrupting existing vegetation.
- Maintain vegetated filter strips so it remains dense and healthy.
- If check dams are installed, repair/replace as necessary.



If check dams are installed in a vegetated buffer strip, they must be repaired/replaced as necessary.



TYPICAL VEGETATED BUFFER STRIP

NOTES:

1. PROVIDE AND MAINTAIN A 50-FOOT UNDISTURBED BUFFER AND SEDIMENT CONTROL FROM STATE WATERS.
2. IF THE EARTH DISTURBANCES ARE LOCATED LESS THAN 50 FEET FROM STATE WATERS, MAINTAIN AN UNDISTURBED NATURAL BUFFER AND INSTALL DOUBLE SEDIMENT CONTROL (E.G. DOUBLE PERIMETER CONTROL) SPACED A MINIMUM OF 5 FEET APART.
3. THE DEPARTMENT DOES NOT CONSIDER ALL STORM WATER CONTROL FEATURES (E.G. STORM WATER CONVEYANCE CHANNELS, STORM DRAIN INLETS, SEDIMENT BASINS) TO BE STATE WATERS.



Description

Temporary linear sediment barrier composed of permeable fabric designed to intercept and slow sediment-laden storm water.

Applications

- Install along the site perimeter.
- Install around temporary spoil or stockpiles.
- Install along streams and channels.
- Position below the toe of cleared or erodible slopes.
- Protect downslope of exposed soil areas.
- Place along the top of slope or other areas to reduce effects of sheet flow.

Installation and Implementation Requirements

- Install silt fence along or parallel to contours.
- Excavate a trench 6 inches wide and 6 inches deep along the line of the silt fence (soil slicing may be considered).
- Place the bottom of the silt fence in the trench.
- Backfill the trench and compact the soil by hand or mechanically.
- Silt fence posts shall be wooden, 1.25-inch × 1.25-inch × 48-inch, and be driven a minimum of 14 inches into the trench (*see* silt fence detail). Posts shall be installed on the down slope side of the silt fence. Silt fence posts may be attached to the fabric on-site or silt fence with pre-attached posts may also be used.

Installation and Implementation Requirements *(continued)*

- Silt fence products using steel rebars in lieu of wood posts must use #4 or larger rebar and must include a safety cap on all exposed edges.
- Silt fence must be overlapped 6 inches between adjoining segments or may be overlapped, wrapped, and rolled.
- Ends of silt fence shall be turned uphill.
- Primarily used where sheet flow occurs.
- When using 2 rows of silt fence, install far enough apart to prevent the collapse of 1 fence from impacting the other.
- Install silt fence according to the specifications listed above or per manufacturer's specifications, whichever is more stringent.



Properly installed silt fences are overlapped between adjoining segments or are overlapped, wrapped, and rolled.

Considerations

- Avoid installing silt fence on slope. However, if silt fence is placed on a slope, fence posts may need additional embedment.
- Do not install in streams, channels, or areas of concentrated flow.
- Do not use to divert flow.

What to Inspect

- Is there sediment accumulating behind the silt fence?
- Is the silt fence properly installed?
- Is there evidence of undermining or undercutting?
- Are adjoining segments seamless?
- Does silt fence have rips, tears, or degradation of fabric?
- Are stakes on downgradient side?
- Is the fabric securely attached to the stakes?



Silt fences must be trenched in a trench 6 inches wide and 6 inches deep, backfilled, and compacted.

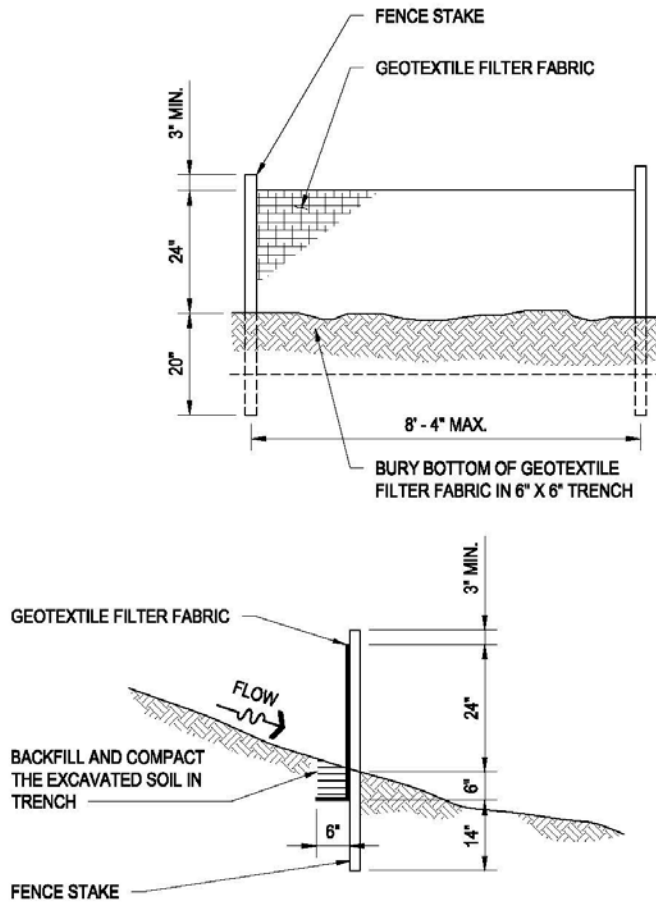
Maintenance

- Repair or replace damaged fence or posts.
- Repair or replace split, torn, slumping, or weathered silt fence.
- Repair or reinstall silt fence where undercutting has occurred.
- Remove accumulated sediment when depth reaches one-third the barrier height.
- Maintain vegetative ground cover upstream of the silt fence. Bare soil upstream of the silt fence can increase frequency and possibility of silt fence failure.



Repair or reinstall silt fence where undercutting has occurred.

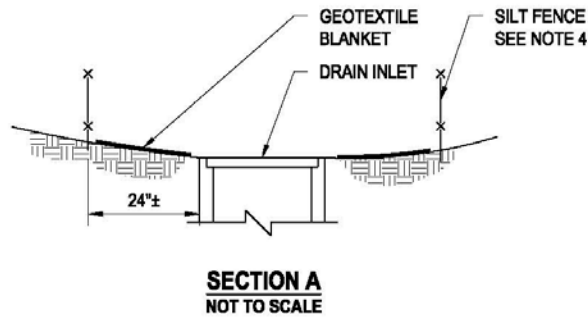
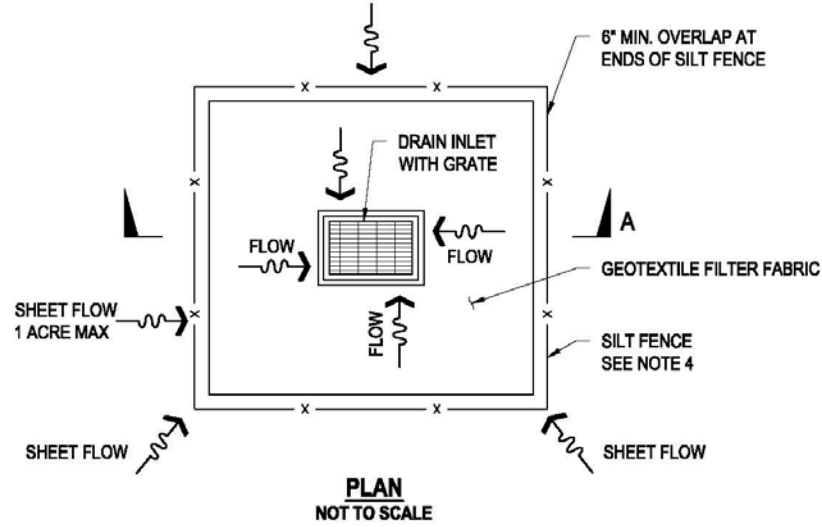
Silt Fence or Filter Fabric Fence



NOTES:

1. THE FILTER FABRIC SHALL BE A MINIMUM OF 36 INCHES WIDE.
2. IF SILT FENCE IS OBTAINED FROM MANUFACTURER AS A PACKAGE (I.E. FABRIC ATTACHED TO POST) THE MANUFACTURER'S INSTALLATION INSTRUCTION SHALL BE ADHERED TO.
3. FENCE STAKE MAY BE WOOD OR METAL, MUST BE CAPABLE OF SUPPORTING ANTICIPATED LOADS.
4. SILT FENCE MUST BE OVERLAPPED 6" BETWEEN ADJOINING SEGMENTS OR MAY BE OVERLAPPED, WRAPPED, AND ROLLED.

SILT FENCE
NOT TO SCALE



NOTE:

1. FOR USE IN AREAS WHERE GRADING HAS BEEN COMPLETED AND FINAL SOIL STABILIZATION AND SEEDING ARE PENDING.
2. NOT APPLICABLE IN PAVED AREAS.
3. NOT APPLICABLE IN CONCENTRATED FLOWS.
4. REFER TO BMP SC-7, SILT FENCE OR FILTER FABRIC FENCE.

GEOTEXTILE FILTER FABRIC FENCE FOR DROP INLET FILTER



Description

Berms consisting of compost material placed perpendicular to runoff to reduce flow velocity and retain sediment and other pollutants. A fiber roll may consist of straw, flax, mulch, or other similar materials bound into a tight tubular roll.

Applications

- Along the site perimeter.
- Along the slope face and toe of slope (*See* section EC-5 Earth Dikes, Swales, and Ditches).
- Check dam in small drainage ditches (*See* section SC-3 Check Dams).
- Inlet protection for storm drains (*See* section SC-1 Storm Drain Inlet Protection).
- Surrounding base of temporary stockpiles (*See* section SM-3 Stockpile Management).
- Appropriate for small drainage areas and low surface velocity flows (less than 1 cubic feet per second (cfs)).
- Vegetative filtering system.
- Applied as a comprehensive system to storm water management.
- Used as perimeter control for disturbed/bare areas.

Installation and Implementation Requirements

- Usually located at the base of slopes, however, additional berms may be used for velocity dissipation devices mid-slope to increase erosion protection. See section EC-9 Slope Interceptor or Diversion Ditches/Berms for more information.
- Compost quality shall comply with all local, state, and federal requirements. Installation of a compost filter sock, which consists of a mesh tube filled with composted material, as a type of compost filter berm shall comply with the following:
 - Assemble by tying a knot at the end of the mesh sock, filling the sock with compost, and knotting the other end of the sock. A pneumatic blower may be used to fill the sock with compost.
 - Socks shall be 8 inches in diameter, minimum.
 - If more than 1 compost filter sock is placed in a row, the compost filter socks must be overlapped, not abutted. The overlap shall be 6 inches, minimum (or in accordance with the manufacturer’s recommendations), and shall be horizontal, side-by-side. The overlap shall not be vertical, top-to-bottom.
 - Compost filter socks used on concrete or other hard surfaces that make staking non-applicable should be weighed down so it does not become displaced during heavy rain/runoff.
 - Turn ends of filter sock up slope, a minimum of 3 feet, to prevent flow around ends.
 - Compost filter socks must be in continuous contact with the ground. There should be no gaps between the sock and the ground beneath it.
- Compost filter socks may also be used for areas of concentrated flow such as near, but not at or in, streams or shorelines. Compost filter socks cannot be used in-water and must be installed above the high water mark for streams/shorelines.
- Material and equipment must not be stored on top of the compost filter socks while in place. The compost filter sock must always be accessible for inspection and maintenance.



Compost filter socks must be overlapped 6 inches minimum (or in accordance with the manufacturer’s recommendations), not abutted, when more than 1 compost filter sock is placed in a row.



Follow manufacturer’s specifications on proper use for fiber rolls used as velocity dissipation devices on steep slopes.

Installation and Implementation Requirements *(continued)*

- When used as velocity dissipation devices on steep slopes, stake compost filter socks into a 2- to 4-inch-deep trench with a width equal to the diameter of the compost filter sock. Stakes must be driven at least 12 inches into the ground, while leaving a minimum stake height of 2 inches above the compost filter sock. Drive stakes through the center at the end of each compost filter sock and space apart 4 feet maximum on center.
- Follow manufacturer's specifications on proper use.
- At the completion of project, filter sock material, including the compost, shall be removed from the site and disposed of/reused properly. Fill and compact trenches once compost filter socks are removed.
- Material for compost berm/filter sock may be left at the site and used as a soil amendment, if approved by the Engineer. Material should be spread, not left in a clump or pile. The geotextile netting must be disposed of properly.

Considerations

- Do not install below the high water mark of streams/shorelines or in-water.
- Unsuitable for areas with concentrated runoff unless a low flow rate and small drainage area warrants use of a filter berm/sock. Compost filter socks should be installed per manufacturer's recommendations.
- Heavy vegetation must be removed to ensure close contact of compost with the ground surface.
- Difficult to move once saturated.
- Uneven terrain may restrict use of BMP.
- Heavy construction equipment and/or vehicles that run over compost filter socks can easily damage or impair the performance of the device.
- Soil may harden on the geotextile filter fabric, which will inhibit infiltration and proper effectiveness.
- Efficiency quickly decreases as sediment accumulates. Frequent maintenance is needed.
- Berms/socks cannot be staked or trenched when used on concrete and rocky surfaces.

What to Inspect

- Does the filter sock have rips or tears exposing the filter media?

What to Inspect *(continued)*

- Does the filter sock need to be trenched and staked?
- Has sediment accumulated to one-half the height of the berm? Are compost filter socks positioned in the correct orientation to effectively manage storm water? Is there evidence of rills or gullies forming under the compost berm?
- Is there vehicles or equipment stored on top of the berm?
- Are compost filter socks properly installed according to manufacturer’s specifications?

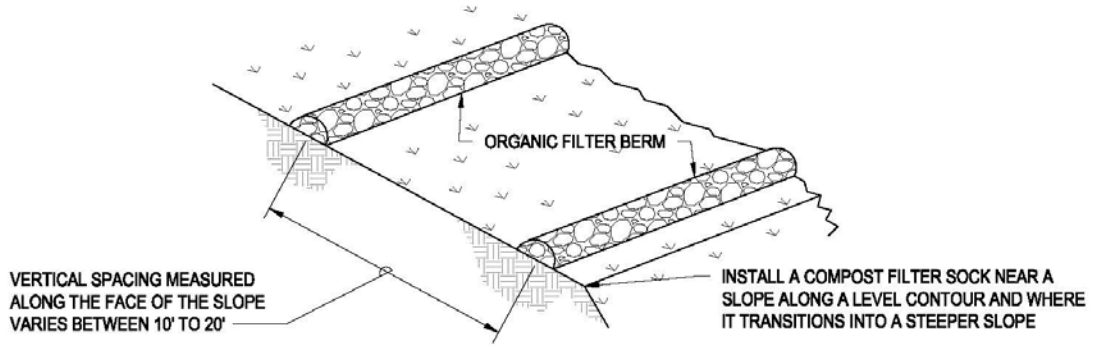
Maintenance

- Remove sediment which has accumulated to within one-half of the berm height.
- Replace disturbed or damaged areas of the berm.
- Repair/replace split, torn or slumping compost filter socks.
- Repairs to damaged compost filter socks must preserve filtration capabilities. Do not use duct tape, glue, or any material that will diminish the effectiveness of the compost filter sock.
- Maintain BMP until the disturbed area above the device is permanently stabilized.
- Reorient compost filter socks that have been disturbed.
- Clean hardened soil on geotextile filter fabric to ensure proper filtration can occur.
- Fix berms/socks that have been driven over and flattened.

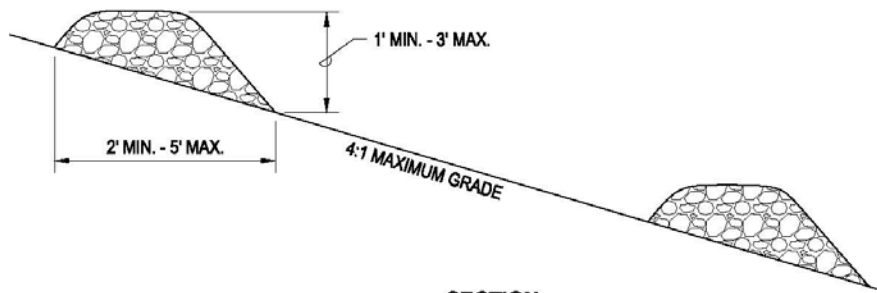


Repair/replace split, torn, or slumping compost filter socks to preserve filtration capabilities.

Compost Filter Berm/Sock

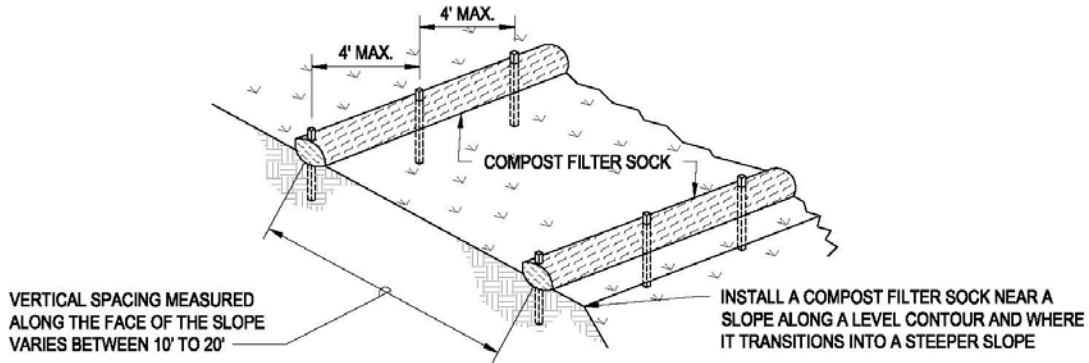


PERSPECTIVE
NOT TO SCALE

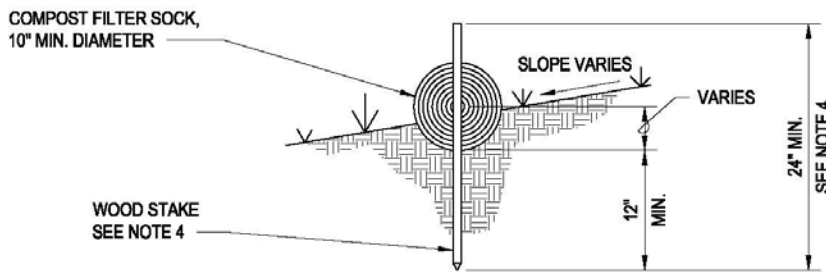


SECTION
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COMPOST FILTER BERM



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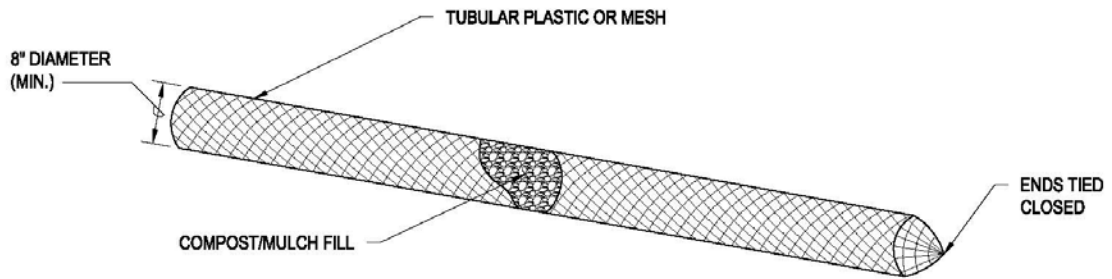
SECTION
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NOTES:

1. COMPOST FILTER SOCKS SHOULD BE EITHER PREFABRICATED OR ASSEMBLED AT SITE.
2. LOCATE COMPOST FILTER SOCKS ON LEVEL CONTOURS SPACED AS FOLLOWS:
 - a. SLOPE INCLINATION OF 4:1 (H:V) OR FLATTER: COMPOST FILTER SOCKS AND/OR BERMS SHOULD BE PLACED AT A MAXIMUM INTERVAL OF 20 FT.
 - b. SLOPE INCLINATION BETWEEN 4:1 AND 2:1 (H:V): COMPOST FILTER SOCKS (USE OF BERMS NOT RECOMMENDED) SHOULD BE PLACED AT A MAXIMUM INTERVAL OF 15 FT. (A CLOSER SPACING IS MORE EFFECTIVE).
 - c. SLOPE INCLINATION OF 2:1 (H:V) OR GREATER: COMPOST FILTER SOCKS SHOULD BE PLACED AT MAXIMUM INTERVAL OF 10 FT.
3. TURN THE ENDS OF THE COMPOST FILTER SOCKS UP SLOPE TO PREVENT RUNOFF FROM GOING AROUND THE ROLL.
4. STAKE COMPOST FILTER SOCKS WITH STAKES WITH A MINIMUM LENGTH OF 14 IN. AND SPACED 4 FT. ON CENTER, OR AS RECOMMENDED BY THE MANUFACTURER, WHICHEVER IS GREATER.
5. IF MORE THAN ONE COMPOST FILTER SOCKS IS PLACED IN A ROW, THE ROLLS SHOULD BE OVERLAPPED, NOT ABUTTED.

COMPOST FILTER BERM (FILTER SOCK)

Compost Filter Berm/Sock



COMPOST FILTER BERM (FILTER SOCK)
NOT TO SCALE



Description

Device used to intercept sediment-laden sheet flow, and allow sediment to settle prior to discharging off-site.

Applications

- Along the site perimeter.
- Along streams and channels.
- Utility trench barriers in channels.
- Across swales and small catchments.
- Diversion dike or berm.
- Below toe of exposed slopes.
- Temporary sediment trap.
- Around stockpiles.
- Weigh down inlet protection devices.



Sandbag barriers intercept sediment-laden sheet flow and allow sediment to settle prior to discharging off-site.

Installation and Implementation Requirements

- Install bags end-to-end along a level contour.
- Turn ends of sandbag barrier up slope to prevent flow around ends.
- May be used in combination with soil stabilization controls up slope.

Installation and Implementation Requirements *(continued)*

- Stack sandbags cross-sectionally in a pyramid formation if bags are to be stacked higher than 2 bags. If additional reinforcement is used, then stack sandbags in a brick wall formation.
- Materials for sandbag barrier shall comply with the following:
 - Sandbag shall be woven polypropylene or polyamide fabric with ultraviolet protection to avoid rapid deterioration of fabric.
 - Bag dimensions can vary but must be able to withstand anticipated flows.
 - Fill material shall consist of non-cohesive, permeable material free of fines from clay and deleterious material.
- Sandbag barriers are allowed to be used in-stream provided that they will not become flood hazards, sandbag contents do not leak into the stream bottom, and they are removed once the project is completed.



Sandbags may be stacked in a brick wall-like formation if additional reinforcement is used.

Considerations

- Drainage area shall not exceed 5 acres.
- Avoid installing at locations which may compromise traffic safety.
- Burlap material shall not be used for sandbags.
- Does not filter sediment.
- Bags degrade when exposed to sunlight.
- Not adequate for long-term projects.
- Depending on application, installation may require an adequate amount of manpower.
- Not ideal for concentrated flows.

What to Inspect

- Has sediment accumulated?
- Does the sandbag have tears or rips?
- Are sandbags evenly spaced to weigh down inlet protection?
- Does the sandbag need to be replaced or reoriented?

What to Inspect *(continued)*

- Is there evidence of erosion undermining the sandbag barrier?
- Is water bypassing the sandbag barrier?

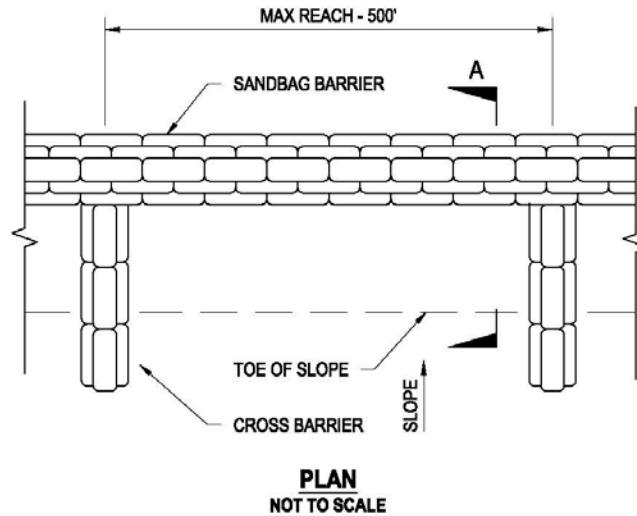
Maintenance

- Reshape or replace sandbags as necessary.
- Remove and properly dispose of sediment, which has accumulated to a depth of 6 inches.
- Remove sandbags if they are no longer in use. If the area needs to be stabilized, do so immediately after removal.



Ensure that disturbed sandbags are reshaped or replaced as necessary.

Sandbag Barrier

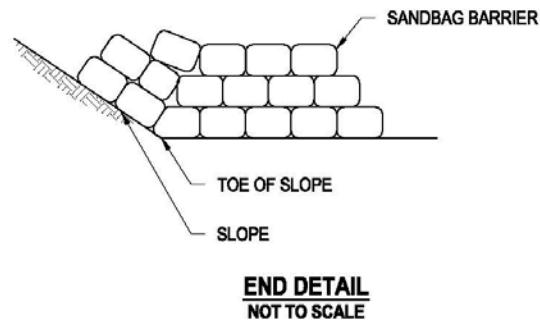
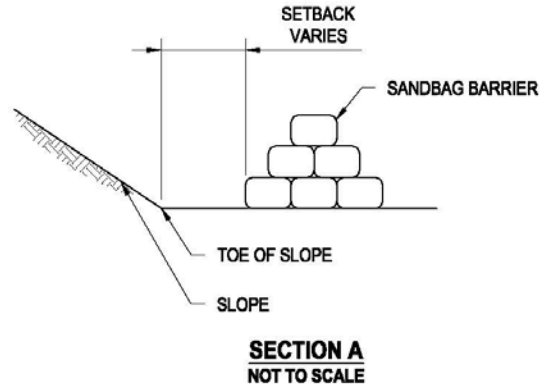


NOTES:

1. CONSTRUCT THE LENGTH OF EACH REACH SO THAT THE CHANGE IN BASE ELEVATION ALONG THE REACH DOES NOT EXCEED 1/2 THE HEIGHT OF THE LINEAR BARRIER.
2. IN NO CASE SHALL THE REACH LENGTH EXCEED 500 FEET.
3. PLACE SANDBAGS TIGHTLY.
4. DIMENSIONS MAY VARY TO FIT FIELD CONDITIONS.
5. SANDBAG BARRIER SHALL BE A MINIMUM OF 3 BAGS HIGH.
6. THE END OF THE BARRIER SHALL BE TURNED UP SLOPE.
7. CROSS BARRIERS SHALL BE A MIN OF 1/2 AND A MAX OF 2/3 OF THE HEIGHT OF THE LINEAR BARRIER.
8. SANDBAG MATERIAL MUST CONFORM TO ASTM D3786 AND ASTM D4355.
9. SANDBAG BARRIERS ARE ALLOWED IN -STREAM PROVIDED THAT THEY WILL NOT BECOME FLOOD HAZARDS, SANDBAG CONTENTS DO NOT LEAK, AND THEY ARE REMOVED ONCE THE PROJECT IS COMPLETED.

SANDBAG BARRIER

Sandbag Barrier



SANDBAG BARRIER

Brush or Rock Filter



Description

Filter berms constructed of brush or rock placed across a level contour area where sheet flow may occur to trap sediment and reduce flow velocity.

Applications

- Check dams across construction roads with mild slopes.
- Below the toe of slopes.
- Along the site perimeter, streams, or channels.
- Around temporary spoil areas.
- Downstream of small cleared areas.
- Sediment traps at culvert or pipe outlets.

Installation and Implementation Requirements

- Use stones between 0.75 to 3 inches in diameter or brush wrapped in geotextile filter fabric. Brush from site clearing may be used. Place across areas of sheet flow.
- Installation of rock filter berms with geotextile filter fabric should be used when possible.
- A brush filter berm can be made of brush, small tree limbs, grass, leaves or other waste material from clearing and grubbing.
- Brush filter berms must be 2 to 5 feet in height to detain storm water. The base width of the berm must be 5 to 10 feet with a shape that is either a triangle or slightly rounded.

Installation and Implementation Requirements *(continued)*

- Install filter 5 to 7 feet from toe of slope to allow ponding.
- Larger rocks must be placed as the base of the berm. Smaller rocks must be placed on the uphill side to form a natural filter.
- Place larger rocks without fines in a gabion to stabilize areas of concentrated flow.
- Use larger stones placed in staked and woven wire sheathing if stones are used across an area of concentrated flow.
- Construct along a level contour.
- Provide an area behind berm for detention and sedimentation.
- Geotextile filter fabric, rope, or wire mesh screen can be used to keep the shape of the berm intact.
- Install the geotextile filter fabric into a 6-inch-deep trench uphill from berm.
- Secure filter fabric with staples, stakes, or rope to protect the brush from being displaced from wind or a storm.

Considerations

- Adequate detention area behind berm is necessary to prevent flooding upstream.
- Drainage area shall not exceed 5 acres.
- Removal of stone berms may be difficult, resulting in limited usefulness in landscaped areas.
- Must not be used in continuously flowing streams.
- Ponding may occur if not sized properly.

What to Inspect

- Has rock or brush been displaced?
- Is ponding occurring in undesired areas?
- Is there evidence of erosion or sheet flow?
- Is the height and width of the device appropriate for the flow?

Maintenance

- Reshape berm and replace any missing or dislodged stone or brush.
- Remove and dispose of sediment on upstream site of filter upon reaching a depth of 6 inches.
- Replace geotextile filter fabric when tears and rips limit effectiveness.

Brush or Rock Filter

