



# LAND DISTURBING PERMIT APPLICATION

## SUBMISSION REQUIREMENTS FOR PROJECTS LESS THAN 1 ACRE OF DISTURBANCE (NOT PART OF A COMMON PLAN OF DEVELOPMENT)

Print

Clear

DIVISION OF ZONING & DEVELOPMENT SERVICES  
16 Courthouse Square Warrenton, VA 20186

Erosion & Sediment Phone: 540-422-8240  
Community Development Phone: 540-422-8200  
Facsimile: 540-422-8231

### Items below are required for the Land Disturbance/Zoning Permit application:

- Erosion & Sediment Control Checklist\*
  - Land Disturbance/Zoning Permit Application with original signatures\*  
(If applicant is other than the property owner, applicant must provide proof of authority to act as an agent for the owner in this application)
  - Erosion & Sediment Control Narrative\*
  - Two (2) copies of a Site Plan/Sketch (aerial, plat or drawing can be used)
  - Responsible Land Disturber (RLD) Certification
  - Thumb drive containing individual PDFs of all submission materials
  - Fees
    - Land Disturbance Permit fee - \$500.00 + \$150.00 x (acres) = \$ \_\_\_\_\_
    - Zoning Permit fee = \$ 100.00
    - Land Disturbing w/out permit fee (if applicable) - \$250 = \$ \_\_\_\_\_
- Subtotal:** = \$ \_\_\_\_\_
- \_\_\_\_\_ + \_\_\_\_\_ **Total Amount Due:** = \$ \_\_\_\_\_
- Subtotal                      10% Technology Fee

\* Included in this packet

### Additional submission requirements as applicable:

- VDOT Entrance Permit
- Health Department Construction Permit
- Wetlands impacts or pond/stream work will require additional permitting from the US Army Corp of Engineers and/or Virginia Department of Environment Quality
- Minimum Standard 19 Requirements: Three (3) cross sections and calculations for areas of concentrated flow. Example – stream crossings. *Replacing an existing pipe is not exempt from this criteria.*
- Floodplain certification – required for crossings and access built in floodplain.
- If applying for land disturbance for a farm structure, a separate zoning permit application is required for the farm structure.

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# LAND DISTURBING PERMIT APPLICATION

Zoning Permit #: \_\_\_\_\_

Land Disturbing Permit #: \_\_\_\_\_

DIVISION OF ZONING & DEVELOPMENT SERVICES  
16 Courthouse Square, Suite 100

Erosion & Sediment Phone: 540-422-8240  
Community Development Phone: 540-422-8200

Warrenton, VA 20186

Facsimile: 540-422-8231

Application is made for a land disturbing permit in accord with the description and for the purposes hereinafter set forth and in accordance with the Fauquier County Erosion and Stormwater Management Ordinance, effective July 1, 2024, as amended, and Section 13-501 of the Fauquier County Zoning Ordinance.

- Land Disturbing Permit                       Supplemental Land Disturbing Plan                       Stop Work Reinstatement  
 Zoning Permit                                       Other: \_\_\_\_\_

Project Name: \_\_\_\_\_ Approved Site Plan Case No.: \_\_\_\_\_

Project Location (Rte. /St#): \_\_\_\_\_ PIN #: \_\_\_\_\_

Acreage to be Disturbed: \_\_\_\_\_ Project Completion Date: \_\_\_\_\_

Provide a brief description of the type of work (ex: building a road or driveway, single family home) and the land area involved (square feet, acres, length of road):

\_\_\_\_\_  
\_\_\_\_\_

DESIGNATED RESPONSIBLE LAND DISTURBER	
Name: _____	Certificate No.: _____
Address: _____	Phone: _____
_____	Email: _____

As owner, I hereby certify that:

- I have read and examined this application and know the information provided is true and correct.
- I agree to comply with the Erosion and Sediment Control Plan, approved by the County and with the Fauquier County Erosion and Stormwater Management Ordinance.
- I further grant right-of-entry onto the property described above and in that attached plan, to the agents and employees of Fauquier County for purposes of inspection or monitoring of the installation or re-installation, of erosion and sediment control measures.
- I further agree to comply with all applicable provisions of the Fauquier County Zoning ordinance for purposes of satisfying Section 13-501 of the Fauquier County Zoning Ordinances.

I understand that the issuance of this Land Disturbing Permit under the provisions of Chapter 11 of the Code of Fauquier County in no way guarantees or vests me with any other type of administrative or legislative permit approval in regard to this property, which is the subject of the Land Disturbing Permit. I agree to comply with the inspection and monitoring report schedule that has been/or will be set for me during the Erosion and Sediment Control Plan review process.

OWNER	APPLICANT
Name: _____	Name: _____
Address: _____	Address: _____
Phone: _____	Phone: _____
Email address: _____	Email address: _____
_____	_____
Owner's Signature                      Date	Applicant's Signature                      Date

**FOR OFFICIAL USE ONLY: ZONING**

Zoning Permit # \_\_\_\_\_ Land Disturbing Permit # \_\_\_\_\_

Zoning Designation: \_\_\_\_\_ Required Setbacks – Front: \_\_\_\_\_ Side: \_\_\_\_\_ Rear: \_\_\_\_\_

Do the following apply to the property?

Floodplain:  No  Yes

BOS Easement:  No  Yes

Proffers:  No  Yes .....Case #: \_\_\_\_\_

Site Plan:  No  Yes .....Case #: \_\_\_\_\_

SP or SE:  No  Yes .....Case #: \_\_\_\_\_

Notes/Comments For Permit:

\_\_\_\_\_/\_\_\_\_\_  
Signature: Zoning Administrator/Staff      Date

# EROSION AND SEDIMENT CONTROL NARRATIVE

## For Disturbances Less than 1 Acre

The requirements set forth in this narrative have been adapted from the Virginia Stormwater Management Handbook (VSMH). A copy of this narrative must be submitted with the land disturbing permit application.

**Please read through the E&S narrative below and acknowledge you read these statements with your signature below:**

- ◆ Minimum Standards 1-19 (attached) from the VSMH will be followed when implementing this plan.
- ◆ The E&S Inspector has the **authority** to add or delete E&S controls as necessary in the field as site conditions change. In addition, no E&S controls can be removed without written authorization.
- ◆ If a permanent stream crossing is to be installed as a part of this plan, calculations on the adequacy of the culverts used will need to be provided. (Minimum Standard 19)
- ◆ Permanent stabilization of the site will be accomplished following the guidelines in tables C-SSM-09-3, C-SSM-10-7, and C-SSM-11-5 of the VSMH (tables attached).
- ◆ Perimeter sediment trapping measures must be installed on site as a first step. (Minimum Standard 4)
- ◆ Once this plan has been approved, a pre-construction conference must be coordinated with an E&S inspector at (540) 422-8240 by the applicant.
- ◆ If the RLD changes, notify our office in writing within 7 days with the new RLD information.
- ◆ Disturbance beyond the approved limits of clearing and grading will require an amendment to the existing approved plan and **an additional \$250.00 fee for disturbing outside limits of clearing and grading.**
- ◆ MS-19 calculations and 3 cross sections are required at areas of concentrated flow. ***Existing pipes are not exempt from this criteria.***
- ◆ E&S controls will be maintained per standards and specifications set forth in the Virginia Stormwater Management Handbook and/or as required by the E&S inspector. (9VAC25-875)
- ◆ If land disturbance exceeds 1 acre, an engineered E&S and SWM plan will be required to be submitted for review as required in the Erosion and Stormwater Management ordinance effective July 1, 2024.

**Please acknowledge you have read the above items with your signature below:**

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## PLAN PREPARATION

### Part I: NARRATIVE

**Project description** – Briefly describes the nature and purpose of the land-disturbing activity (Chapter 4, VSMH).

To include:

- \_\_\_\_\_ Total acreage of site
  - \_\_\_\_\_ Total disturbed acreage
  - \_\_\_\_\_ How many acres will be permanently stabilized with grass or other vegetation?
  - \_\_\_\_\_ Provide detailed directions to the site (Google Map can be used)
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**Off-site-areas** – Describe any off-site land-disturbing activities that will occur (including borrow sites, waste or stockpile areas, etc.) (9VAC25-875-240, Chapter 4, VSMH).

- \_\_\_\_\_ Does the site balance in regard to amount of cut and fill?
- \_\_\_\_\_ Will offsite areas be used as a borrow area or stockpile?
- \_\_\_\_\_ Is the stockpile going to be temporary or permanent? Stockpiles are permanent if they will remain in the same location for a year. There are zoning restrictions for stockpiles.

If soil is to be taken off site, an [Offsite Soil Tracking Form](#) will be required. Soil being taken to another site or brought from another site should always be permitted.

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**Adjacent areas** – A description of neighboring areas such as streams, lakes, residential areas, roads, etc., which might be affected by the land disturbance (Chapter 4, VSMH). Include all adjacent sensitive areas such as wetlands or water bodies.

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**Critical areas** – A description of areas on the site which have potentially serious erosion problems (Chapter 4, VSMH).

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**Construction Sequencing** – Explain the sequencing of the project incorporating installation of E&S controls and required stabilization.

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**Temporary Stream Crossing Installation-** (MS-12 thru 15, C-ENV-03 - if a permanent stream crossing is needed, calculations on the adequacy of culverts will need to be provided by an engineer)

Types of diversion need to be provided. How will the work be done in the dry? What type of crossing will be used? Include the stabilization and/or removal process.

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**Minimum Standard 19 Conclusion:** \*3 cross sections are required

Adequate channel means a channel that will convey the designated frequency storm event without overtopping the channel bank nor causing erosive damage to the channel bed or banks.

***Existing pipes are not exempt from this criteria.***

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**Provide soils information \***– A brief description of the soils on the site giving such information as (Chapter 4, VSMH): Interpretive Type 1 Soils Guide can be found at <http://www.fauquiercounty.gov/home/showdocument?id=7292>

*Ask staff if you need assistance finding this information.*

- \* **If land disturbance is occurring in soil locations that are identified potentially hydric inclusions or hydric may require additional requirements for the Corp of Engineers. Please contact our office to discuss what is required.**

Mapping Unit	Soil Name	Erodibility	Permeability	Depth	Texture	Soil Structure	Hydric or Hydric Inclusions

\*Specify micaceous soils

\*Specify high water table soils

Part II: SITE PLAN/SKETCH – *Aerial, plats, topo maps can be used.*

Provide a site plan that will be a graphical representation of the site from a “bird’s eye” point of view. All applicable items below should be provided on one plat or aerial photo.

<p><b>Provide the following items and/or show all of the applicable items on the E&amp;S plan:</b>  <b>*The E&amp;S plan should be at a scale of at least 1" = 200'* (Chapter 4, VSMH)</b></p>	
<p><b>Identify all erosion &amp; sediment controls that will be used onsite:</b>                  *Recommended Symbols to be used:</p> <p style="padding-left: 40px;">                     ----- Limits of clearing and grading (LOD)                      -X-X-X-X-X Silt fence (SF)                      000000000000 Construction entrance (CE)                 </p>	
<ul style="list-style-type: none"> <li><input type="checkbox"/> Limits of clearing and grading (all disturbed areas)</li> <li><input type="checkbox"/> House site</li> <li><input type="checkbox"/> Accessory structures (barns, sheds, etc.)</li> <li><input type="checkbox"/> Riding rings</li> <li><input type="checkbox"/> Driveway/access to structures</li> <li><input type="checkbox"/> Drainfields</li> <li><input type="checkbox"/> Well location</li> <li><input type="checkbox"/> Construction entrance at all access points</li> <li><input type="checkbox"/> Staging areas “equipment or parking areas”</li> <li><input type="checkbox"/> Stockpile/borrow areas</li> <li><input type="checkbox"/> Areas of safety fence (drainfield location)</li> <li><input type="checkbox"/> Phase 1 E&amp;S controls</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Existing conditions (aerial photo)</li> <li><input type="checkbox"/> Existing vegetation (tree line, grassed area, or unique vegetation)</li> <li><input type="checkbox"/> Offsite stockpile areas</li> <li><input type="checkbox"/> Power line/utility installation</li> <li><input type="checkbox"/> Stream crossings</li> <li><input type="checkbox"/> Drainage/Utility easements if available</li> <li><input type="checkbox"/> Critical areas (streams, wetlands, channels, etc.)</li> <li><input type="checkbox"/> Existing contours: provide a topographic map</li> <li><input type="checkbox"/> Final contours</li> <li><input type="checkbox"/> Vicinity map</li> <li><input type="checkbox"/> Provide north arrow on each plan sheet</li> </ul>

**E&S Controls used onsite (additional controls may be required depending on the site):**

- ◆ **Construction Entrance (C-SCM-03):** A stabilized stone pad with filter fabric underliner located at points of vehicular ingress and egress on a construction site.
- ◆ **Silt fence (C-PCM-04):** A temporary sediment barrier consisting of a synthetic filter fabric stretched across and attached to supporting posts and entrenched.
- ◆ **Berm (C-ECM-04):** A temporary ridge of compacted soil constructed at the top or base of a sloping disturbed area – used in conjunction with sediment trap or check dam based on drainage area.
- ◆ **Sediment trap (C-SCM-11):** A temporary ponding area formed by constructing an earthen embankment with a stone outlet
- ◆ **Culvert inlet protection (C-SCM-05):** A sediment filter located at the inlet to storm sewer culverts.
- ◆ **Outlet protection (C-ECM-15):** Structurally lined aprons or other acceptable energy dissipating devices placed at the outlets of pipes or paved channel sections.

**Please acknowledge you have read the above items with your signature below:**

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**Temporary Stabilization: C-SSM-09**

Areas that will be denuded for more than 14 days will be temporarily seeded with appropriate annual plants. These areas may include, but not limited to, denuded areas, soil stockpiles, dikes, and temporary roadbanks, etc.

**Maintenance**

Stabilized areas will be inspected weekly and after storm events until a dense cover of vegetation has become established. Areas which fail to establish vegetative cover adequately will be reseeded as soon as such areas are identified.

Table C-SSM-09-3 Plant Material for Temporary Seeding		
Acceptable Temporary Seeding Plant Materials "Quick Reference for all Regions"		
Planting Dates	Species	Rate (pounds per acre)
Sept. 1 – Feb. 15	50/50 Mix of annual ryegrass ( <i>Lolium multi-florum</i> ) & cereal (winter) rye ( <i>Secale cereale</i> )	50 – 100
Feb. 16 – Apr. 30*	Annual ryegrass ( <i>Lolium multi-florum</i> )	60 – 100
May 1* – Aug. 31	German millet ( <i>Setaria italica</i> )	50

\* The shift date for annual rye to German millet should be April 15 for the Piedmont and Coastal Plain, rather than May 1.

**Final/Permanent Stabilization: C-SSM-10**

Areas that are at final grade will be stabilized within 7 days with the appropriate permanent perennial plants.

**Maintenance**

All seeded areas will be inspected weekly during construction activities for failure and after storm events until a dense cover of vegetation has been established. If failure is noticed at the seeded area, the area will be reseeded, fertilized, and mulched immediately. After construction is completed at the site, permanently stabilized areas will be monitored until final stabilization is achieved.

Table C-SSM-10-7 Site-Specific Seeding Mixtures for Piedmont Area			
Site Condition	Seed Mix		Application Rate (pounds per acre)
Minimum-Care Lawn Commercial or Residential	Turf-Type Tall Fescue	95-100%	150 – 200
	Improved Perennial Ryegrass	0-5%	
	Kentucky Bluegrass	0-5%	
High-Maintenance Lawn	Improved (VCIA) Turf-Type Tall Fescue	100%	150 – 200
	Tall Fescue***		50 – 75
General Slope (3H:1V or less)	Red Top or Red/Hard Fescue		10 – 20
	White Clover and/or Birdsfoot Trefoil**		10 – 20
	Seasonal Nurse Crop*		30 – 40
	Tall Fescue		50 – 75
Low-Maintenance Slope (> 3:1) or Inaccessible Area***	Red Top and/or Hard Fescue		5 – 10
	White Clover and/or Birdsfoot Trefoil**		15 – 20
	Annual Lespedeza**		10 – 15
	Seasonal Nurse/Cover Crop		20-30

\* Use seasonal nurse crop in accordance with seeding dates as stated below: February 16 through April annual rye  
 February 16 through April – annual/cereal rye  
 May 1 through August 15 – foxtail/German millet  
 August 16 through February 15 – annual/cereal rye

\*\* Use legume seed that is properly inoculated with specified Rhizobia. Legumes recommended unless periodic N fertilization is intended. Weeping lovegrass may be added to any slope or low-maintenance mix during warmer seeding periods; add 10 to 20 lbs/acre in mixes.

**Mulching: Std and Spec. C-SSM-11**

Mulching with seed will provide a temporary cover for immediate protection to exposed soil until there is vegetative growth.

**Maintenance**

Mulched areas will be inspected weekly and after storm events to check for washout or erosion. Mulch will be re-applied if areas of failure are identified.

<b>Table C-SSM-11-5 Organic Mulch Materials and Application Rates</b>			
<b>Mulches</b>	<b>Rates</b>		<b>Notes</b>
	<b>Per Acre</b>	<b>Per 1,000 ft<sup>2</sup></b>	
Straw or Hay	1.5 to 2 tons	70 to 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand. Use a minimum of 2 tons per acre for winter cover.
Fiber Mulch	1,500 lbs.	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods. Apply as slurry. When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./acre or 45 lbs./1,000 ft <sup>2</sup> .
Corn Stalks	4 to 6 tons	185 to 275 lbs.	Cut or shredded in 4- to 6-inch lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 to 6 tons	185 to 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.
Bark Chips or Shredded Bark	50 to 70 cy	1 to 2 cy	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

Source: Va. DSWC

# C-SCM-03 Temporary Stone Construction Entrance

## 1.0 Definition

A temporary stone construction entrance is a pad with a fabric filter liner underneath the stone located at points of vehicular ingress and egress on a construction site. There are several types of track-out controls that minimize the amount of sediment, such as dirt or mud, leaving or being tracked out from the construction site attached to vehicles.

– CAD C-SCM-03-1 Stone Construction Entrance

## 2.0 Purpose and Applicability of Best Management Practices

Construction entrances provide an opportunity for significant removal of mud from construction vehicle tires before they enter a public road, and, just as important, the soil adjacent to the paved surface can be kept intact. Temporary stone construction entrances reduce the tracking of mud onto paved public roads by motor vehicles or runoff and provide a stable entry to or exit from the construction site.

This practice applies where traffic leaves a construction site and moves directly onto a public road or other paved area.

## 3.0 Planning and Considerations

A fabric filter liner is used as a “separator” to minimize the dissipation of aggregate into the underlying soil due to construction traffic loads. If the action of the vehicles traveling over the gravel pad is not sufficient to remove most of the mud, or there exists an especially sensitive traffic situation on the adjacent paved road, wash the tires before the vehicle enters the public road. If washing is necessary, make provisions to intercept the wash water and trap the sediment so it can be collected and stabilized.

Use construction entrances in conjunction with stabilization of construction roads (see Construction Road Stabilization [BMP C-SCM-02]) to reduce the amount of mud picked up by



Stone Construction Entrance with Washrack

construction vehicles and better remove mud. Encourage vehicles (other than construction equipment) to remain in stabilized areas where possible to avoid mud accumulation on vehicles’ tires that will regularly enter and leave the site. Other innovative techniques for accomplishing the same purpose (such as a bituminous entrance) can be used, but only after specific plans and details are submitted and approved by the appropriate certified plan reviewer.

## 4.0 Stormwater Performance Summary

**MS-17: VEHICULAR TRACKING AND CONSTRUCTION ENTRANCES** – Provisions shall be made to minimize the transport of sediment from the site onto the paved surface.

**MS-4: FIRST-STEP MEASURES** – Sediment basins and traps, perimeter dikes, sediment barriers, and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.

9VAC25-875-560

**Erosion Control Efficiency: MODERATE**

**Sediment Removal Efficiency: MODERATE**

## 5.0 Design Criteria

**Table C-SCM-03-1 Design Criteria for Temporary Stone Entrance**

Parameter	Notes on Proper Use
Aggregate Size	<p>Use Virginia Department of Transportation (VDOT) #1, #2, or #3 Coarse Aggregate (1.5- to 3.5-inch stone) or American Association of State Highway and Transportation Officials (AASHTO) #1 Course Aggregate (2.5- to 3.5-inch stone).</p>
Entrance Dimensions	<p>Construct the aggregate layer to be a minimum of 6 inches thick and place a minimum 3 inches of aggregate in a cut section to give the entrance added stability and help secure the fabric filter separator.</p> <p>Extend the entrance to the entire width of the vehicular ingress and egress area and have a minimum 12-foot width.</p> <p>Construct the entrance length at a minimum of 70 feet except for smaller construction projects (total disturbance area of less than 1 acre) or sites with entrance constraints.</p> <p>For these project sites, the minimum length is the greater of either 30 feet or a length sufficient for all on-site equipment to make at least two tire revolutions when crossing the trackout surface.</p> <p>Where site conditions warrant that it may be necessary to extend the length or width of the rock to ensure the effectiveness of the entrance.</p>
Mountable Berm & Culvert Pipe	<p>Where access to the site crosses a roadside ditch, stream channel, or natural drainage course, provide a suitable means of conveying the flow past the entrance (e.g., an appropriately sized culvert pipe). Size the pipe to convey the runoff generated by the 2-year, 24-hour frequency storm at a minimum. The minimum permissible pipe size is 6 inches.</p> <p>For such installations, install a mountable berm above the pipe to avoid crushing the pipe. Construct the 3-foot-wide mountable berm centered above the pipe with 5H:1V side slopes and 6 inches higher than the elevation of the rest of the construction entrance.</p>
Filter Fabric	<p>Use filter fabric that is a woven fabric consisting only of continuous-chain polymeric filaments or yarns of polyester. Use filter fabric inert to commonly encountered chemicals and hydrocarbons, mildew and rot-resistant, and conforms to the physical properties noted in Table 1.</p>

**Table C-SCM-03-1 Design Criteria for Temporary Stone Entrance**

Parameter	Notes on Proper Use
Washing	<p>If most mud is not removed by the vehicles traveling over the stone, wash the vehicles' tires before entering the public road. Carry wash water away from the entrance to an approved settling area or sediment removal device (e.g., sediment basin or trap, silt fence, or compost filter sock) to remove sediment. Prevent all sediment from entering storm drains, ditches, or watercourses.</p> <p>Use a wash rack to make washing more convenient and effective for washing mud from the tires of the work vehicles only. A reinforced concrete or metal wash rack are both viable options to reduce the presence of sediment from work vehicles leaving the construction site (PA DEP 2012).</p> <p>Wash racks are unsuitable for complete truck washing and only apply to washing the vehicle tires. If there is a need for a full wash of vehicles, refer to standard detail Concrete Washout Pit (C-SCM-13). Additionally, ensure that wash racks immediately discharge to a sediment removal device (e.g., sediment basin or trap, silt fence, or compost filter sock) before the water enters waterbodies (PA DEP 2012).</p>
Location	<p>Locate the entrance to provide for maximum use by all construction vehicles. Locate the entrance on level ground at an appropriate site distance. Avoid locating the entrance on steep slopes and ensure the entrance drains transversely to prevent runoff from the entrance flowing into the adjacent roadway.</p> <p>Entrance configurations off the paved road may be modified to allow tractor trailers or longer delivery vehicles adequate area to safely exit the paved road onto the construction entrance and re-enter onto the paved road from the construction entrance.</p>

**Table C-SCM-03-2 Construction Specifications for Filter Fabric Liner Under Aggregate Stone**

Fabric Properties <sup>1</sup>	Light-Duty Entrance <sup>2</sup> (Graded Subgrade)	Heavy-Duty Entrance <sup>3</sup> (Rough Graded)	Test Method
Grab Tensile Strength (lbs.)	200	315	ASTM D4632
Grab Tensile Elongation (%)	15	15	ASTM D4632
Trapezoidal Tear (lbs.)	75	113 – 120	ASTM D4533
CBR Puncture Strength (lbs.)	700	900	ASTM D6241
Apparent Opening Size	40	40	ASTM D4751

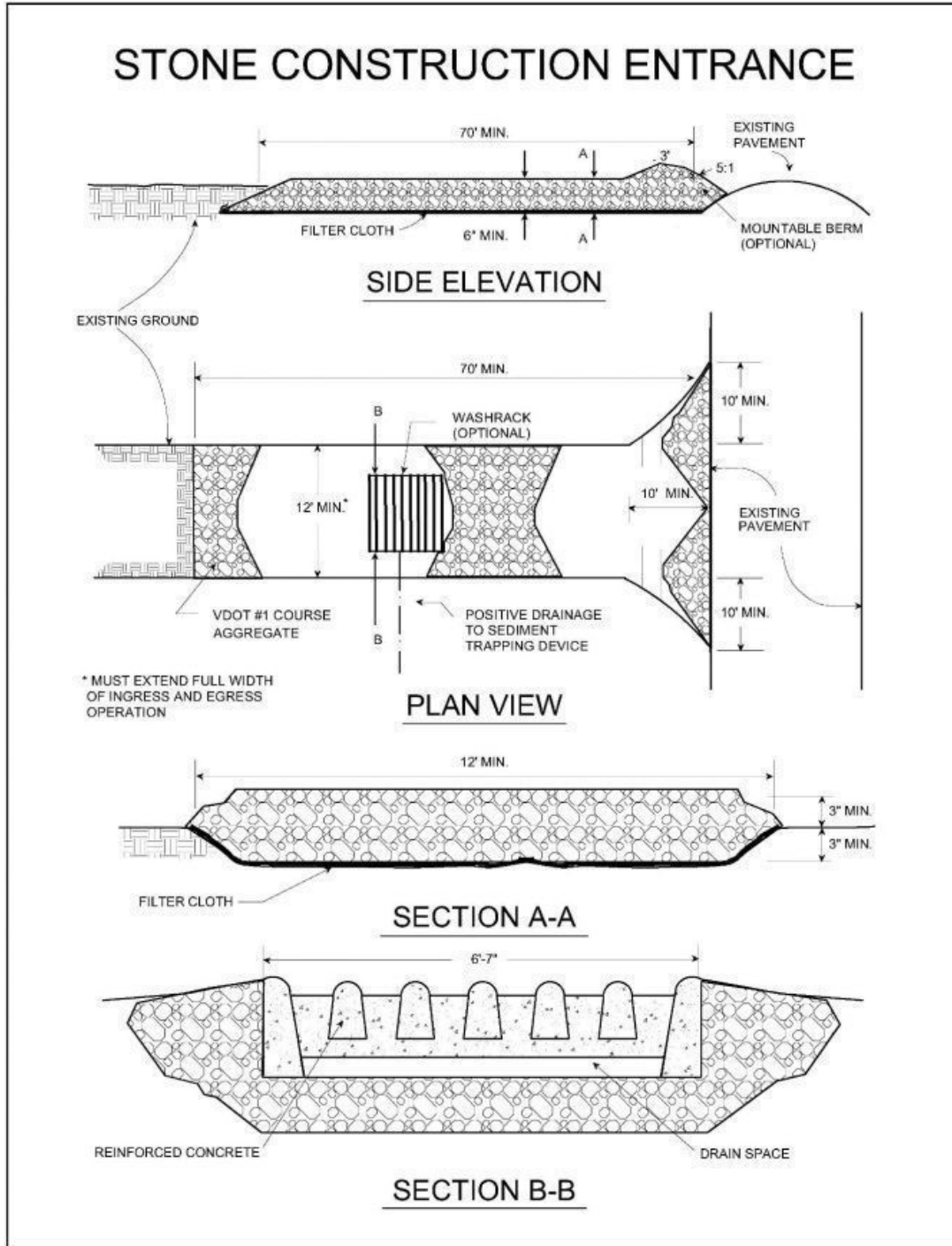
## Table C-SCM-03-2 Construction Specifications for Filter Fabric Liner Under Aggregate Stone

Fabric Properties <sup>1</sup>	Light-Duty Entrance <sup>2</sup> (Graded Subgrade)	Heavy-Duty Entrance <sup>3</sup> (Rough Graded)	Test Method
<ol style="list-style-type: none"> <li>1. Only use fabrics not meeting these specifications when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.</li> <li>2. <b>Light-Duty Entrance:</b> Sites that have been graded to subgrade and where most travel would be by single-axle vehicles and an occasional multi-axle truck. Examples of fabrics that can be used are: Mirafi 500X, Skaps SW200, Geotex 200 ST, or equivalent.</li> <li>3. <b>Heavy-Duty Entrance:</b> Sites with only rough grading and where most travel would be by multi-axle vehicles. Examples of fabrics that can be used are: Mirafi 600X, Skaps SW315, Geotex 315 ST, or the equivalent.</li> </ol>			

### 6.0 Construction Specifications

1. Excavate the entrance area to a minimum of 3 inches and clear the area of all vegetation, roots, and other objectionable material.
2. Construct any drainage facilities according to specifications. Provide for the conveyance of surface water under the entrance through culverts.
3. Place the filter fabric underlayment atop the entire width and length of the entrance.
4. Following the filter fabric installation, place the stone to the specified dimensions (including the construction of the mountable berm) as necessary.
5. If wash racks are used, install wash racks according to manufacturer's specifications. Ensure the wash rack can convey sediment-laden water immediately to a sediment control treatment device before entering a water body.
6. Confirm the length and width of the construction entrance before setting up erosion control measures and perimeter control measures.

**Figure C-SCM-03-1 Stone Construction Entrance**



SOURCE: ADAPTED FROM 1983 MARYLAND STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL, AND VA. DSWC

Source: Maryland Water Resources Administration et al. 1983

## 7.0 Operations and Maintenance Considerations

Inspect the construction entrance weekly and immediately after each rainfall.

Maintain the entrance to prevent tracking or flow of dirt, mud, or sediment onto public rights-of-way, including periodic top dressing with additional stone and repair or cleanout of structures that trap sediment or both. Maintain a stockpile of rock at the site for top dressing purposes.

Mud and soil particles will eventually clog the voids in the stone and compromise the effectiveness of the construction entrance. When this occurs, top dress the pad with new stone. Complete stone replacement is necessary when the pad becomes wholly clogged with sediment and the topdressing is no longer effective at removing accumulated sediment from tires.



*Improperly Maintained Stone Construction Entrance- Stones Dislodged Spilling into Adjoining Roadway*

Immediately remove all materials spilled, dropped, washed, or tracked from vehicles onto roadways or storm drains. Do not use water trucks to remove materials dropped, washed, or tracked onto roadways under any circumstances.

Immediately remove stones from the adjoining roadway that construction traffic dislodged from the entrance.

Maintain the area under the wash rack free of accumulated sediment. Repair or replace the wash rack if it becomes damaged.

## 8.0 References

Maryland Water Resources Administration, Soil Conservation Service, and State Soil Conservation Committee. 1983. Maryland Standards and Specifications for Soil Erosion and Sediment Control. April.

## C-PCM-04 Silt Fence

### 1.0 Definition

Silt fence (and its derivatives **wire-supported (reinforced) and super silt fence**) is a temporary sediment barrier consisting of a synthetic filter fabric entrenched and stretched across and attached to supporting posts.

- CAD C-PCM-04 Construction of a Silt Fence (Without Wire Support)
- CAD C-PCM-04-2 Construction of a Silt Fence (With Wire Support)

### 2.0 Purpose and Applicability of Best Management Practice

Silt fence intercepts and detains small amounts of sediment from disturbed ground areas during construction to prevent sediment from leaving the site. Silt fence decreases the water velocity of sheet flow and low-level channel flows to moderate-level channel flows.

Super silt fence is used to control runoff from some small, disturbed areas where the maximum slope lengths for standard silt fence and wire-supported (reinforced) silt fence cannot be met and space is insufficient for construction of sediment traps or basins.

Silt fence and its derivatives (wire-supported (reinforced) and super silt fence) are not to be used as check dams in any application.

### 3.0 Planning and Considerations

Use silt fence downstream or below disturbed areas where erosion would occur in the form of sheet and rill erosion.

Do not use silt fence where rock or other hard surface prevents the full and uniform depth anchoring of the barrier.

Do not use super silt fences where rock or rocky soil prevent the full and uniform anchoring of the fence or proper installation of the fence posts.

Only use super silt fence where access exists or can be made for the construction equipment required to install and remove the chain link fencing.

Super silt fence chain link and posts may be reused on multiple projects and may present a more cost-effective alternative to silt fence.

Super silt fences can mitigate sheet flow from disturbed areas to sinkholes and other karst features.

Do not use this BMP in areas of concentrated flow.

Reinforced or super silt fence may be used in areas where there is a high potential for physical stress, as at the bottoms of steep fills, where the silt fence may be impacted by loose fill material or dirt clods may roll down the slope face during grading.

Reinforced and super silt fence will resist breakage and overturning from physical impacts much better than regular silt fence and will require much less maintenance.

### 4.0 Stormwater Performance Summary

**MS-4: FIRST-STEP MEASURES** – Sediment basins and traps, perimeter dikes, sediment barriers, and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.

**Erosion Control Efficiency: LOW**

**Sediment Removal Efficiency: MEDIUM**

**Table C-PCM-04-1 Typical Flow Rates and Filtering Efficiencies of Perimeter Controls**

Material	Flow Rate (gallon/minute/foot)	Total Solids Removal Efficiency (%)	Total Suspended Solids Removal Efficiency (%)	Turbidity Reduction (%)
Mulch Filter Berm <sup>a</sup>	0.47	54.8	51.3	8.1
Straw Bale <sup>a</sup>	0.46	65.1	53.8	11.8
8-inch Compost Filter Sock <sup>a</sup>	0.37	84.3	75.9	28.6
12-inch Compost Filter Sock <sup>a</sup>	0.37	85.0	84.9	19.1
Silt Fence	0.11	89.0	87.0	76.0

Footnote:

- a. Runoff of 2.9 inches on a 2,500-square-foot watershed to replicate maximum spacing requirements for silt fence typically used for sediment control on disturbed soils for 10% slope (Faucette et al. 2008.).

Source for Mulch Filter Berm, Straw Bale, and Compost Filter Sock: Faucette et al. 2009.

Source for Silt Fence: Faucette et al. 2008.

## 5.0 Design Criteria

Design silt fence and its derivations in accordance with [Figure C-PCM-04-1 Maximum Slope Length for Silt Fence](#).

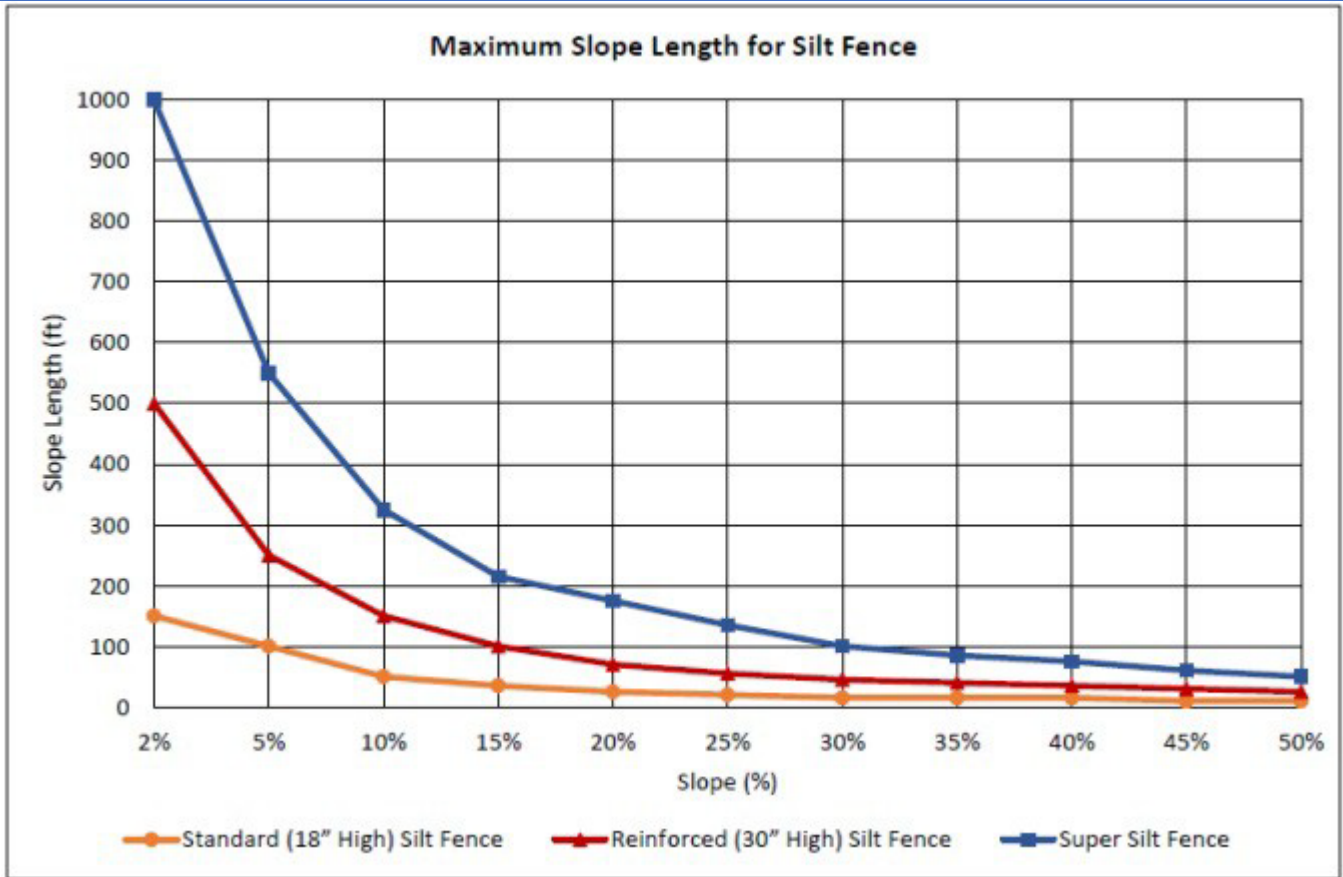
As with straw bale barriers, locate silt fence at least 5 to 7 feet beyond the bases of disturbed slopes with grades greater than 7 percent.

Do not exceed the maximum slope length in existing, temporary, or final grade above any silt fence at any time during the construction, as shown in [Table C-PCM-04-2 Maximum Slope Length \(feet\) Above Fence](#). The slope length shown is the distance from the fence to the drainage divide or the nearest upslope channel.

If a super silt fence is used to mitigate sheet flow to sinkholes, the fence should be installed around the sinkhole's outer edge ("parapet") within 1 to 2 feet outside the slope in the parapet.

Trenchless silt fence (Specification BMP [C-ENV-10](#)) may be used in areas where existing wooded vegetation is to remain and trenched installation would otherwise damage the root ball.

**Figure C-PCM-04-1 Maximum Slope Length for Silt Fence**



Source: Faucette et al. 2008.

**Table C-PCM-04-2 Maximum Slope Length (feet) Above Fence**

Slope (%)	Standard (18 inches High) Silt Fence	Reinforced (30 inches High) Silt Fence	Super (33 inches High) Silt Fence
2 (or less)	100	500	1000
5	100	250	550
10	50	150	325
15	35	100	215
20	25	70	175
25	20	55	135
30	15	45	100
35	15	40	85
40	15	35	75
45	10	30	60

**Table C-PCM-04-2 Maximum Slope Length (feet) Above Fence**

Slope (%)	Standard (18 inches High) Silt Fence	Reinforced (30 inches High) Silt Fence	Super (33 inches High) Silt Fence
50	10	25	50

Source: Pennsylvania Department of Environmental Protection (PADEP) 2012.

## 6.0 Construction Specifications

**Table C-PCM-04-3 Material Specifications for Silt Fence**

**Material Specifications for Silt Fence**

Filter Fabric	<p>Use filter fabric consisting of woven slit film silt fence and is certified by the manufacturer or supplier as conforming to the requirements noted in <a href="#">Table C-PCM-04-4</a>.</p> <p>Ensure fabric has the minimum properties required by state-specific or local specifications, whichever is more stringent. Ensure the fabric is in use no longer than the manufacturer’s recommended life span and is replaced with new fabric after the life span has been exceeded. Use fabric with a minimum width of 30 inches for standard silt fence or 36 inches or greater for reinforced and super silt fences. Ensure stakes are hardwood or equivalent steel (“U” or “T”) stakes.</p> <p>Use toe anchor trench measurements of a minimum of 4 inches vertical by 4 inches horizontal to anchor bottom of filter fabric into the ground.</p> <p>A silt fence is replaced when clogged with sediment and can no longer be cleaned. Synthetic filter fabric containing ultraviolet ray inhibitors and stabilizers shall be used to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120 degrees Fahrenheit.</p>
Stakes	<p>If <u>wooden stakes</u> are used for silt fence construction, ensure the stake has a nominal diameter of 2 inches when oak is used and 4 inches when pine is used. Use wooden stakes with a minimum length of 5 feet.</p> <p>If <u>steel posts</u> (standard “U” or “T” section) are used for silt fence construction, ensure the posts have a minimum weight of 1.33 pounds per linear foot and a minimum length of 5 feet.</p>
Reinforced Silt Fence	<p>Use wire reinforcement for reinforced silt fence using standard-strength filter fabric with a minimum of 14 gauge and a maximum mesh spacing of 6 inches.</p>
Super Silt Fence	<p>Install 2.5-inch-diameter galvanized or aluminum poles set at 10-foot maximum spacing. Install poles at a minimum depth of 24 inches below the ground surface and extend a minimum of 33 inches above ground.</p> <p>Ensure chain link is galvanized No. 11.5 Ga. steel wire with 2.25-inch opening, No. 11 Ga. aluminum coated steel wire in accordance with ASTM-A-491, or galvanized No. 9 Ga. steel wire top and bottom with galvanized No. 11 Ga. steel intermediate wires.</p>

**Table C-PCM-04-4 Physical Properties of Filter Fabric in Standard Silt Fence**

Physical Property	Test	Requirements
Grab Strength Tensile	ASTM D 4632	124 lbs.
Elongation at Failure	ASTM D 4632	15%
CBR Puncture Resistance	ASTM D 6241	325 lbs.
Minimum Trapezoidal Tear Strength	ASTM D 4533	45 lbs.
Apparent Opening Size – U.S. Standard Sieve	ASTM D 4751	30
Flow Through Rate	ASTM D 4491	10 gallons/minute/square foot
Minimum Ultraviolet (UV) Residual	ASTM D 4355	70%

**Notes:**

Source: PADEP 2012, Table 4.3, p.75.

ASTM = ASTM International

CBR = California bearing ratio

lbs. = pounds

**Table C-PCM-04-5 Physical Properties of Filter Fabric in High-Performance Silt Fence**

Physical Property	Test	Requirements
Grab Strength Tensile	ASTM D 4632	180 lbs.
Elongation at Failure	ASTM D 4632	15%
CBR Puncture Resistance	ASTM D 6241	650 lbs.
Minimum Trapezoidal Tear Strength	ASTM D 4533	60 lbs.
Apparent Opening Size – U.S. Standard Sieve	ASTM D 4751	30
Flow Through Rate	ASTM D 4491	129 gallons/minute/square foot
Minimum Ultraviolet (UV) Residual	ASTM D 4355	80%

**Notes:**

Source: Colonial Construction Materials 2022.

ASTM = ASTM International

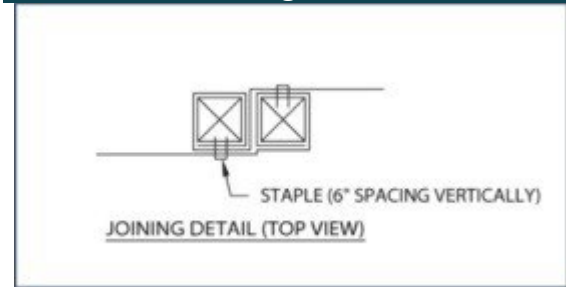
CBR = California bearing ratio

lbs. = pounds

### **Installation for Standard and Reinforced Silt Fence**

1. Install silt fence (after trenching) a minimum height of:
  - a. 18 inches above the original ground surface for standard silt fence; and
  - b. 30 inches above the original ground surface for reinforced silt fence and does not exceed 34 inches above ground elevation.
2. Turn the fence uphill at 45-degree angles at the end of each fence run to prevent run-around bypass.
3. Where silt fence cannot be installed along the

**Figure C-PCM-04-1 Silt Fence Fabric Joining Detail**



Source: Tahoe Regional Planning Agency 2014

contour, J-hooks should be used at the end of each fence run.

4. Purchase the filter fabric in a continuous roll cut to the length of the barrier to avoid the use of joints.
5. At fabric ends, wrap both ends around the support stake and staple (see [Figure C-PCM-04-1](#)). If the fabric comes already attached to the stakes, hold the end stakes together while the fabric is wrapped around the stakes at least one revolution (360 degrees) before driving the stakes.
6. Excavate a trench approximately 4 inches wide and 4 inches deep on the upslope side of the proposed location of the measure.
7. When wire support is used (reinforced silt fence), standard-strength filter fabric may be used. For this type of installation, place posts a maximum of 10 feet apart (see [Figure C-PCM-04-2](#)). Fasten the wire mesh fence securely to the upslope side of the posts using heavy-duty wire staples at least 1 inch long, tie wires, or hog rings. Extend the wire into the trench a minimum of 2 inches and do not extend more than 34 inches above the original ground surface. Staple or wire the standard-strength fabric to the wire fence and extend 8 inches of the fabric into the trench. Do not staple the fabric to existing trees.
8. When wire support is not used (standard silt fence or high-performance silt fence), use extra-strength filter fabric. Place posts for this type of fabric a maximum of 6 feet apart (see [Figure C-PCM-04-3](#)). Fasten the filter fabric securely to the upslope sides of the posts using 1-inch-long (minimum) heavy-duty wire staples or tie wires and extend 8 inches of the fabric into the trench. This method of installation is more commonplace than the use of the reinforced silt fence. Do not staple the fabric to existing trees
9. When attaching two silt fences, first place the end post of one fence inside the end post of the other fence. Rotate both posts at least 180 degrees in a clockwise direction to create a tight seal with the fabric material. Drive both posts a minimum of 18 inches into the ground and bury the flap in a trench.
10. If a silt fence is to be constructed across a ditch line or swale, ensure the measure is of sufficient length to eliminate end-flow, and the plan configuration resembles an arc or horseshoe with the ends oriented upslope (see [Figure C-PCM-04-3](#)). Use extra-strength filter fabric for this application with a maximum 3-foot spacing of posts.
11. Drive stakes a minimum of 18 inches below ground surface.
12. Backfill and compact the 4-inch by 4-inch trench with soil over the filter fabric.
13. Remove the silt fence when the fence has served its useful purpose, but not before the upslope area has been permanently stabilized.

### **Installation for Super Silt Fence**

1. Excavate an 8-inch-deep trench, minimizing the disturbance on the downslope side, with the bottom of the trench at level grade.

2. Install the chain link fence in the downslope side of the trench with the fence on the upslope side of the support poles. Install 2.5-inch- diameter galvanized or aluminum poles set at 10-foot maximum spacing. Install poles at a minimum depth of 24 inches below the ground surface and extend a minimum of 33 inches above ground. A posthole drill may be necessary to install poles appropriately for most sites. Poles do not need to be set in concrete.
3. Fasten chain link fence securely to fence posts with wire ties.
4. Ensure chain link is galvanized No. 11.5 Ga. Steel wire with 2.25-inch opening, No. 11 Ga. Aluminum coated steel wire in accordance with ASTM-A-491, or galvanized No. 9 Ga. Steel wire top and bottom with galvanized No. 11 Ga. Steel intermediate wires. Install No. 7 gage tension wire horizontally through holes at the top of the chain link fence or attach with hog rings, wire fasteners, staples, or preformed clips at 5-foot (maximum) centers.
5. Stretch filter fabric and securely fasten to the fence with wire fasteners, staples, or preformed clips. Extend the fabric a minimum of 33 inches above the ground surface. Ensure the filter fabric width is a minimum of 42 inches.
6. Fasten the filter fabric securely to the chain link fence with fasteners, staples, or preformed clips spaced horizontally 24 inches at the ground surface, top, and midsection.
7. When attaching two super silt fences, the overlap joining method should be used. See [Figure C-PCM-04-3](#).
8. Place the fabric toe in the bottom of the trench, then backfill and compact the trench.
9. Remove and properly dispose of super silt fence when the disturbed area tributary to the fence is permanently stabilized.



Super Silt Fence Source: PADEP 2012, p.82

## 7.0 Operations and Maintenance Considerations

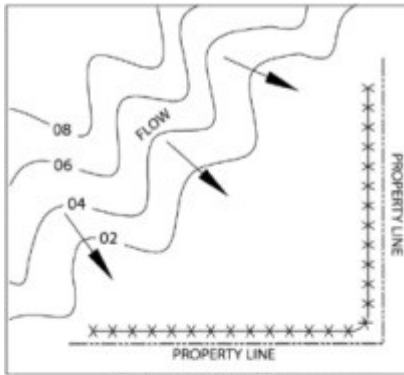
Inspect silt fences immediately after each rainfall and at least daily during prolonged rainfall. Make any repairs immediately.

Pay close attention to the repair of damaged silt fence resulting from end runs and undercutting. This is commonly a sign the fence has either been improperly installed or is placed in a less than optimal location. If the fence cannot be relocated, then more frequent inspections will be warranted.

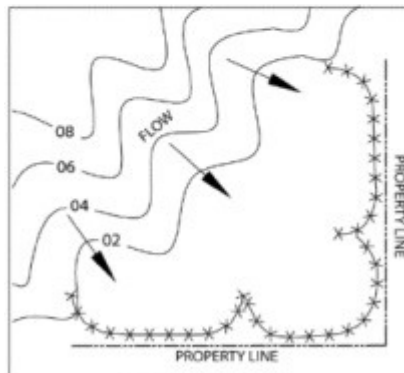
Replace the fabric promptly if the fabric on a silt fence decomposes or becomes ineffective before the end of the expected usable life and the barrier is still necessary.



Silt Fence Failure



**INCORRECT PLACEMENT**  
 DO NOT LAYOUT PERIMETER CONTROL SILT FENCES ALONG PROPERTY LINES. ALL SEDIMENT-LADEN RUNOFF WILL CONCENTRATE AND OVERWHELM THE SYSTEM.



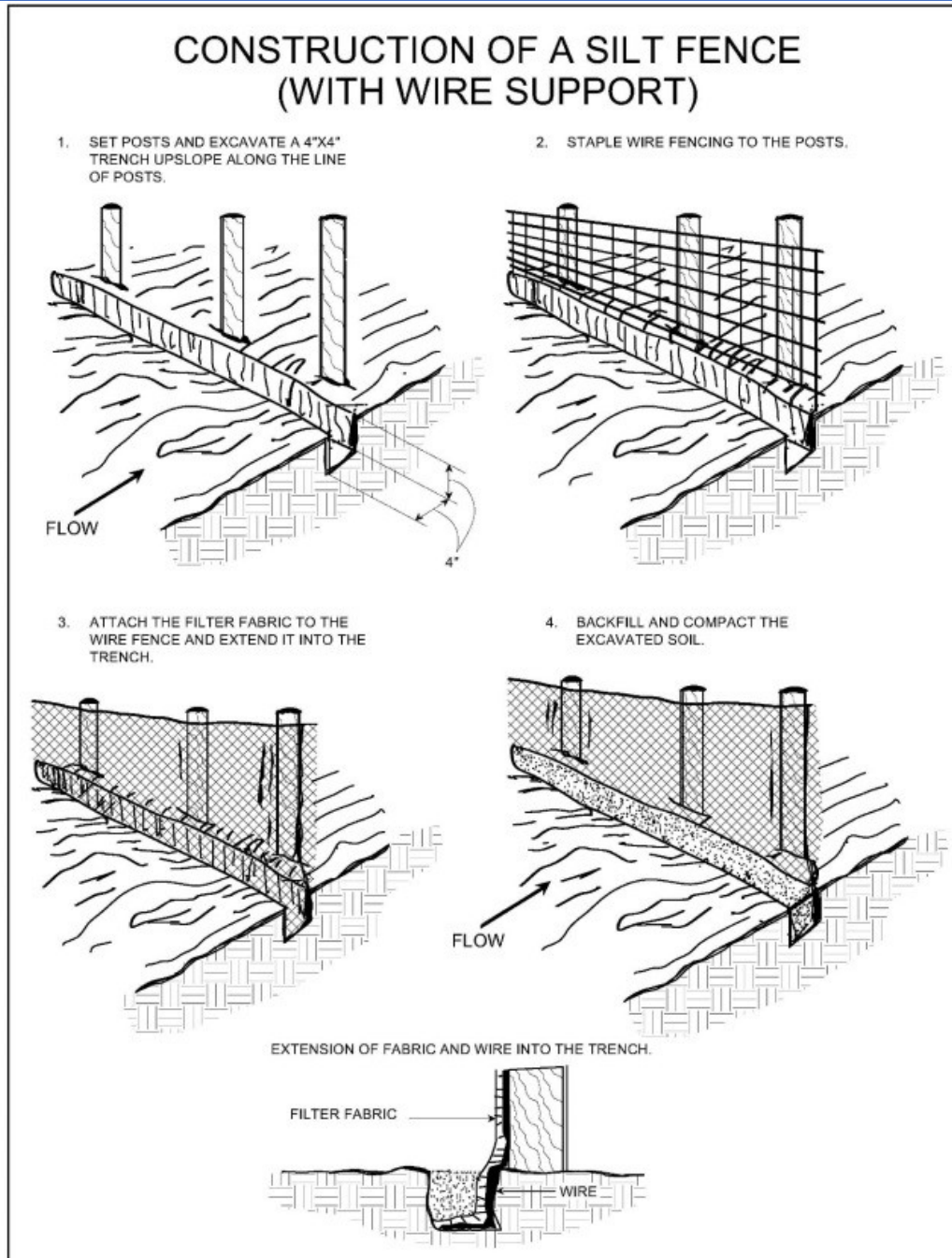
**CORRECT PLACEMENT**  
 BREAK-UP SILT FENCE INTO SECTIONS TO PREVENT SEDIMENT-LADEN RUNOFF FROM CONCENTRATING AND OVERWHELMING THE SYSTEM.

Remove trash, floatables, and large sediment deposits after each storm event and when deposits reach approximately one half the height of the barrier.

Dress to conform to existing grade, prepare, and seed any sediment deposits remaining in place after the silt fence is no longer required.

Where silt fence or any of its derivatives have failed because of concentrated runoff, a rock filter outlet (Specification BMP [C-SCM-08](#)) must be placed at the location. **Do not reinstall using the compromised practice.**

**Figure C-PCM-04-2 Construction of Silt Fence with Wire Support Installation**



SOURCE: ADAPTED FROM INSTALLATION OF STRAW AND FABRIC FILTER BARRIERS FOR SEDIMENT CONTROL, SHERWOOD & WYANT



**9VAC25-875-560. Erosion and sediment control criteria, techniques, and methods: minimum standards.**

An erosion and sediment control plan consistent with the following criteria, techniques, and methods shall be submitted to the VESMP authority or VESCP authority for review and approval:

1. Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year.
2. During construction of the project, soil stockpiles and borrow areas shall be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles on site as well as borrow areas and soil intentionally transported from the project site.
3. A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, is mature enough to survive, and will inhibit erosion.
4. Sediment basins and traps, perimeter dikes, sediment barriers, and other measures intended to trap sediment shall be constructed as a first step in any land-disturbing activity and shall be made functional before upslope land disturbance takes place.
5. Stabilization measures shall be applied to earthen structures such as dams, dikes, and diversions immediately after installation.
6. Sediment traps and sediment basins shall be designed and constructed based upon the total drainage area to be served by the trap or basin.
  - a. The minimum storage capacity of a sediment trap shall be 134 cubic yards per acre of drainage area and the trap shall only control drainage areas less than three acres.
  - b. Surface runoff from disturbed areas that is comprised of flow from drainage areas greater than or equal to three acres shall be controlled by a sediment basin. The minimum storage capacity of a sediment basin shall be 134 cubic yards per acre of drainage area. The outfall system shall, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations shall correspond to a bare earth condition or those conditions expected to exist while the sediment basin is utilized.
7. Cut and fill slopes shall be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within one year of permanent stabilization shall be provided with additional slope stabilizing measures until the problem is corrected.
8. Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume, or slope drain structure.
9. Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.

10. All storm sewer inlets that are made operable during construction shall be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment.
11. Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining shall be installed in both the conveyance channel and receiving channel.
12. When work in a live watercourse is performed, precautions shall be taken to minimize encroachment, control sediment transport, and stabilize the work area to the greatest extent possible during construction. Nonerodible material shall be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if armored by nonerodible cover materials.
13. When a live watercourse must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of nonerodible material shall be provided.
14. All applicable federal, state, and local requirements pertaining to working in or crossing live watercourses shall be met.
15. The bed and banks of a watercourse shall be stabilized immediately after work in the watercourse is completed.
16. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:
  - a. No more than 500 linear feet of trench may be opened at one time.
  - b. Excavated material shall be placed on the uphill side of trenches.
  - c. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both and discharged in a manner that does not adversely affect flowing streams or off-site property.
  - d. Material used for backfilling trenches shall be properly compacted in order to minimize erosion and promote stabilization.
  - e. Restabilization shall be accomplished in accordance with this chapter.
  - f. Applicable safety requirements shall be complied with.
17. Where construction vehicle access routes intersect paved or public roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed in this manner. This provision shall apply to individual development lots as well as to larger land-disturbing activities.
18. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESCP or VESMP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

19. Properties and waterways downstream from development sites shall be protected from sediment deposition, erosion, and damage due to increases in volume, velocity, and peak flow rate of stormwater runoff for the stated frequency storm of 24-hour duration in accordance with the following standards and criteria. Stream restoration and relocation projects that incorporate natural channel design concepts are not manmade channels and shall be exempt from any flow rate capacity and velocity requirements for natural or manmade channels:
- a. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or manmade receiving channel, pipe, or storm sewer system. For those sites where runoff is discharged into a pipe or pipe system, downstream stability analyses at the outfall of the pipe or pipe system shall be performed.
  - b. Adequacy of all channels and pipes shall be verified in the following manner:
    - (1) The applicant shall demonstrate that the total drainage area to the point of analysis within the channel is 100 times greater than the contributing drainage area of the project in question; or
    - (2) (a) Natural channels shall be analyzed by the use of a two-year storm to verify that stormwater will not overtop channel banks nor cause erosion of channel bed or banks  
(b) All previously constructed manmade channels shall be analyzed by the use of a 10-year storm to verify that stormwater will not overtop the stormwater's banks and by the use of a two-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and  
(c) Pipes and storm sewer systems shall be analyzed by the use of a 10-year storm to verify that stormwater will be contained within the pipe or system.
  - c. If existing natural receiving channels or previously constructed manmade channels or pipes are not adequate, the applicant shall:
    - (1) Improve the channels to a condition where a 10-year storm will not overtop the banks and a two-year storm will not cause erosion to the channel, the bed, or the banks;
    - (2) Improve the pipe or pipe system to a condition where the 10-year storm is contained within the appurtenances;
    - (3) Develop a site design that will not cause the predevelopment peak runoff rate from a two-year storm to increase when runoff outfalls into a natural channel or will not cause the predevelopment peak runoff rate from a 10-year storm to increase when runoff outfalls into a manmade channel; or
    - (4) Provide a combination of channel improvement, stormwater detention, or other measures that is satisfactory to the VESCP or VESMP authority to prevent downstream erosion.
  - d. The applicant shall provide evidence of permission to make the improvements.
  - e. All hydrologic analyses shall be based on the existing watershed characteristics and the ultimate development condition of the subject project.
  - f. If the applicant chooses an option that includes stormwater detention, the applicant shall obtain approval from the VESCP or VESMP authority for a plan for maintenance of the detention facilities. The plan shall set

forth the maintenance requirements of the facility and the person responsible for performing the maintenance.

- g. Outfall from a detention facility shall be discharged to a receiving channel, and energy dissipators shall be placed at the outfall of all detention facilities as necessary to provide a stabilized transition from the facility to the receiving channel.
- h. All on-site channels must be verified to be adequate.
- i. Increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property shall be diverted to a stable outlet, adequate channel, pipe, or pipe system or to a detention facility.
- j. In applying these stormwater management criteria, individual lots or parcels in a residential, commercial, or industrial development shall not be considered to be separate development projects. Instead, the development, as a whole, shall be considered to be a single development project. Hydrologic parameters that reflect the ultimate development condition shall be used in all engineering calculations.
- k. All measures used to protect properties and waterways shall be employed in a manner that minimizes impacts on the physical, chemical, and biological integrity of rivers, streams, and other waters of the state.
- l. Any plan approved prior to July 1, 2014, that provides for stormwater management that addresses any flow rate capacity and velocity requirements for natural or manmade channels shall satisfy the flow rate capacity and velocity requirements for natural or manmade channels if the practices are designed to (i) detain the water quality volume and to release it over 48 hours; (ii) detain and release over a 24-hour period the expected rainfall resulting from the one year, 24-hour storm; and (iii) reduce the allowable peak flow rate resulting from the 1.5-year, two-year, and 10-year 24-hour storms to a level that is less than or equal to the peak flow rate from the site assuming the site was in a good forested condition, achieved through multiplication of the forested peak flow rate by a reduction factor that is equal to the runoff volume from the site when the site was in a good forested condition divided by the runoff volume from the site in the site's proposed condition, and shall be exempt from any flow rate capacity and velocity requirements for natural or manmade channels as defined in any regulations promulgated pursuant to § 62.1-44.15:28 of the Code of Virginia (VESMA) or § 62.1-44.15:54 or 62.1-44.15:65 of the Code of Virginia (ESCL).
- m. For plans approved on and after July 1, 2014, the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Code of Virginia (ESCL) and this subdivision 19 shall be satisfied by compliance with water quantity requirements in the VESMA and attendant regulations, unless such land-disturbing activities (i) are in accordance with provisions for time limits on applicability of approved design criteria in 9VAC25-875-480 or grandfathering in 9VAC25-875-490, in which case the flow rate capacity and velocity requirements of § 62.1-44.15:52 A of the Code of Virginia (ESCL) shall apply; or (ii) are exempt pursuant to § 62.1-44.15:34 G 2 of the Code of Virginia (VESMA).
- n. Compliance with the water quantity minimum standards set out in 9VAC25-875-600 shall be deemed to satisfy the requirements of this subdivision 19.