

## MUSCLE WALL SEDIMENT FENCE – BMP C233

**Purpose** Sediment fencing consists of a geotextile fabric with supporting structure. The sediment fence material prevents unwanted silt from escaping the site while the Muscle wall provides support for the fencing and contains holes in the wall and loose fitting connections to allow the water to freely pass through. The weave of the fabric determines the size of the soil particle retained by the silt fence. As heavy large sized particles are retained, they create a build up effect, which will retain smaller sized particulate similar to the way an air filter becomes more effective as it retains dust. At some point, the material behind a sediment fence becomes too efficient, causing the material to rise higher behind the fence and start the retention cycle all over again.

**Conditions of Use** Silt fence may be used downslope of all disturbed areas.

Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to a sediment pond.

The only circumstance in which overland flow can be treated solely by a silt fence, rather than by a sediment pond, is when the area draining to the fence is one acre or less and flow rates are less than 0.5 cfs.

Silt Fences should not be constructed in streams or used in V-shaped ditches. They are not an adequate method of silt control for anything deeper than sheet or overland flow.

Sediment fence spacing on slopes should be at no greater distance than:

	<u>Slope</u>	<u>Spacing</u>
	<20%	100 ft
	<30%	50 ft
	<50%	25 ft
Stock Pile Slope	>50%	25 ft

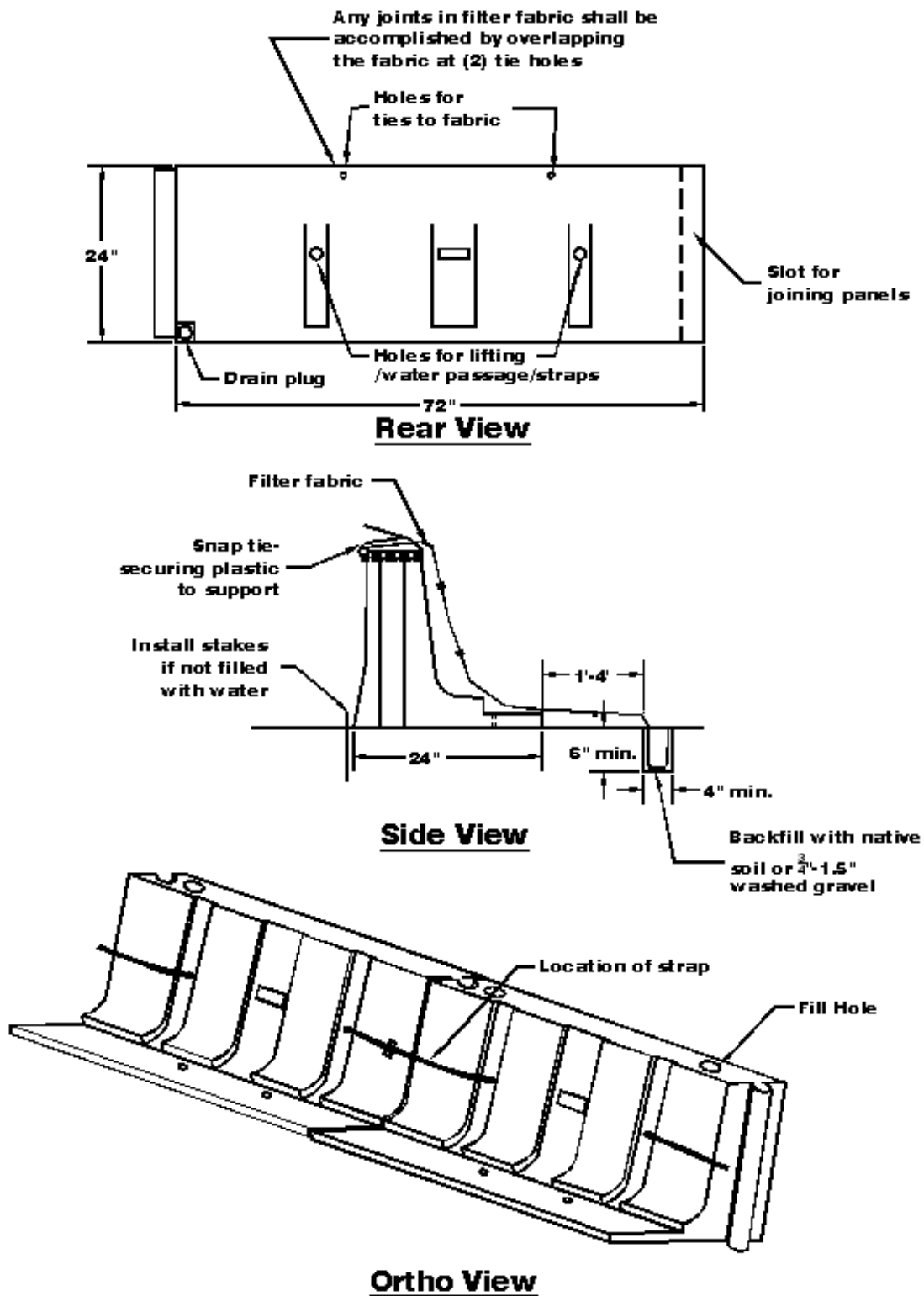
### Design and Installation Specifications

- Drainage area of 1 acre or less or in combination with sediment basin in a larger site.
- When not filled with water, the wall must have stakes installed behind the wall to prevent sliding. Use (2) ½ inch diameter steel bar or rebar a minimum of 24 inches long. With the bar being driven into the ground a minimum of 18 inches.
- Maximum slope steepness (normal (perpendicular) to fence line) 1:1 (H:V).

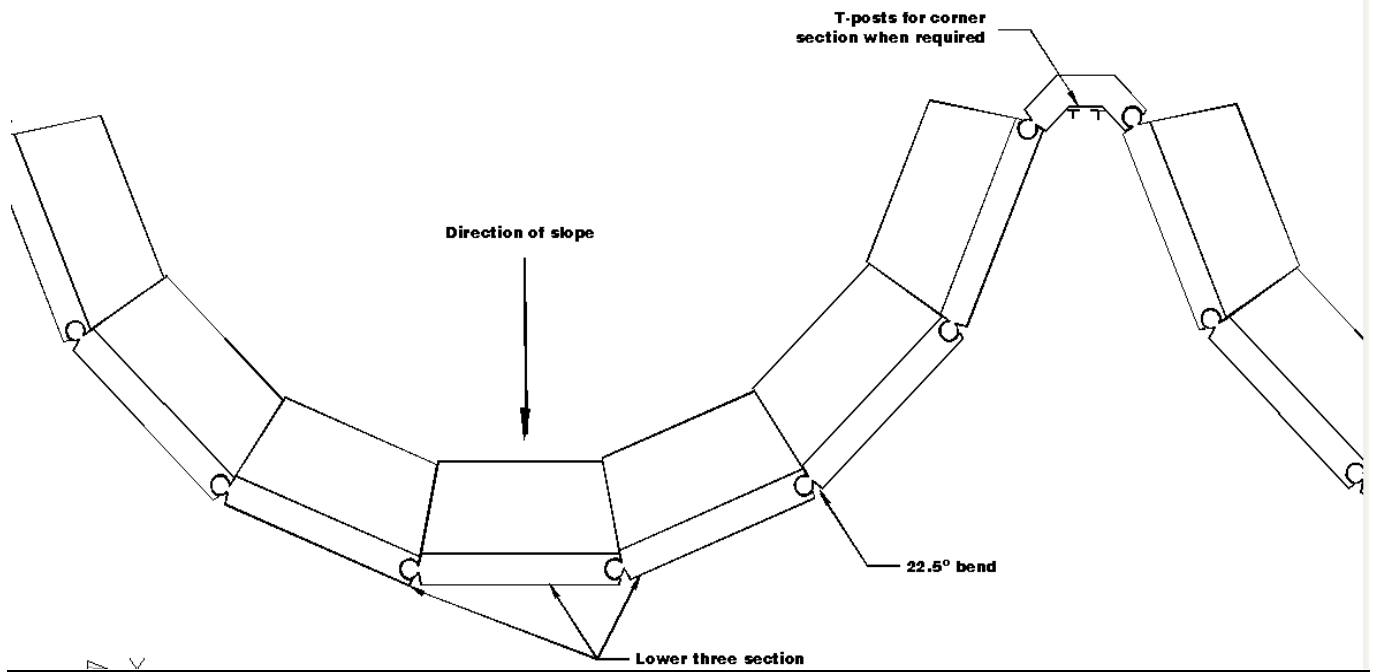
- No flows greater than 0.5 cfs.
- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 4.10):

<b>Table 4.10 Geotextile Standards</b>	
Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film wovens (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec <sup>-1</sup> minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Standard strength fabrics shall be supported with wire mesh, chicken wire, 2-in x 2-in wire, safety fence, or jute mesh to increase the strength of the fabric. Silt fence materials are available that have synthetic mesh backing attached.
- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life.
- Installation on slopes:
  - 2ft section:
    - 0-15%: standard installation
    - 15-30%: standard installation and
      - scallop formation
      - or (2) T-posts behind each wall
      - or level the wall using sandbags up to 1' thick
    - <30%: install per scallop formation with no water in the lower three sections and (2) T-posts behind each reverse corner.
  - 4 ft section
    - 0-10%: standard installation
    - 10-20%: standard installation and
      - scallop formation
      - or (2) T-posts behind each wall
      - or level the wall using sandbags up to 1' thick
    - <20%: install per scallop formation with no water in the lower three sections and (2) T-posts behind each reverse corner.



**Figure 4.20: Muscle Wall Silt Fence Installation**



**Figure 4.21: Muscle Wall Scallop Formation Installation**

**Installation Standard notes for construction plans and specifications follow. Refer to Figures 4.20 and 4.21 for muscle wall silt fence details.**

- The contractor shall install and maintain temporary silt fences at the locations shown in the plans. The silt fences shall be constructed in the areas of clearing, grading, or drainage prior to starting those activities. A silt fence shall not be considered temporary if the silt fence must function beyond the life of the contract. The silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- The geotextile shall be sewn together at the point of manufacture, or at an approved location as determined by the engineer, to form geotextile lengths as required. All sewn seams shall be located near the center of an individual muscle wall unit.
- The geotextile shall be draped over the muscle wall with the top being attached to the muscle wall with snap ties or other tie materials (wire, etc.) at the top of each panel. The geotextile shall be attached to the posts in a manner that reduces the potential for geotextile tearing at said connection device. Silt fence back-up support for the geotextile is provided through the use of the muscle wall. The muscle wall must however, either be filled with water or staked to the ground per manufacturer to maintain the stability of the wall.
- The geotextile at a distance from 1 foot to 4 feet from the toe of the wall shall be buried in a trench to a minimum depth of 6 inches below the ground surface. The trench shall be backfilled and the soil tamped in place over the buried portion of the geotextile, such that no flow can pass beneath the fence and that scouring cannot occur.
- Silt fences shall be located on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.
- If the fence must cross contours, with the exception of the ends of the fence, gravel check dams placed perpendicular to the back of the fence shall be used to minimize concentrated flow and erosion along the back of the fence. The gravel check dams shall be approximately 1-foot deep at the back of the fence. The check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence. The gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. The gravel check dams shall be located every 10 feet along the fence where the fence must cross contours.
- The slope of the fence line where contours must be crossed shall not be steeper than 3:1 (H:V).

## Maintenance Standards

- Any damage shall be repaired immediately.
- If concentrated flows are evident uphill of the fence, they must be intercepted and conveyed to a sediment pond.
- It is important to check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.
- Sediment deposits shall either be removed when the deposit reaches approximately one-third the height of the silt fence, or a second silt fence shall be installed.
- If the filter fabric (geotextile) has deteriorated due to ultraviolet breakdown, it shall be replaced.