

## Pretreatment Vegetated Filter Strip



### Description

A pretreatment vegetated filter strip is a uniformly graded, vegetated area (i.e., grass or close-growing native vegetation) that is used to treat sheet flow from adjacent pervious and impervious areas prior to entering a structural stormwater BMP.

Pretreatment vegetated filter strips reduce runoff velocity and utilize vegetation to filter coarse sediment and debris. Pretreatment vegetated filter strips should span the entire width of the contributing area to ensure treatment of runoff from the entire area and are most effective if they receive uniformly distributed sheet flow. A level spreader is required if the filter strip receives concentrated flow or flow that could become concentrated because concentrated flows reduce the effectiveness of the practice. [Figure 13-2](#) shows a schematic of a vegetated filter strip used for pretreatment of runoff from pervious and impervious areas prior to discharge to a structural stormwater BMP.

Unlike the vegetated pervious areas that are suitable for providing stormwater retention and treatment credit as described in [Chapter 5 - Low Impact Development Site Planning and Design Strategies](#), pretreatment vegetated filter strips are not stand-alone treatment practices due to their relatively small size and should only be used immediately upgradient of another structural stormwater BMP. Pretreatment vegetated filter strips provide relatively limited runoff volume reduction, infiltration, and peak flow reduction.

### Stormwater BMP Type

Pretreatment BMP	■
Infiltration BMP	□
Filtering BMP	□
Stormwater Pond BMP	□
Stormwater Wetland BMP	□
Water Quality Conveyance BMP	□
Stormwater Reuse BMP	□
Proprietary BMP	□
Other BMPs and Accessories	□

### Stormwater Management Suitability

Retention	□
Treatment	□
Pretreatment	■
Peak Runoff Attenuation	□

### Pollutant Removal

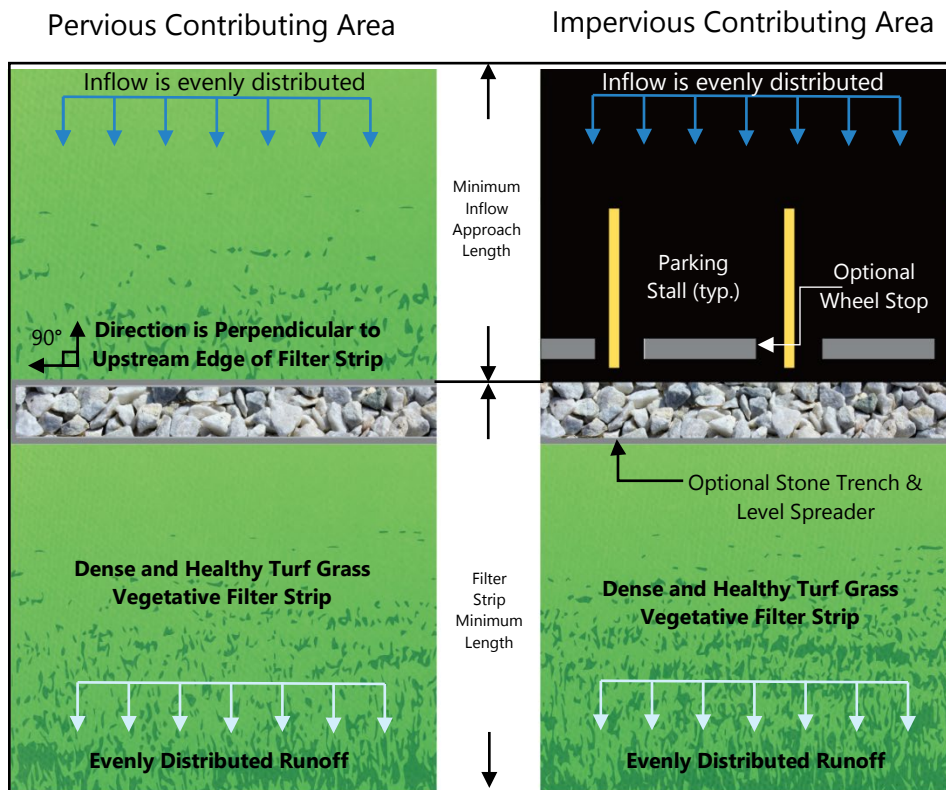
Sediment*	<b>High</b>
Phosphorus	<b>Variable</b>
Nitrogen	<b>Variable</b>
Bacteria	<b>Low</b>

\*Includes sediment-bound pollutants

### Implementation

Capital Cost	<b>Low</b>
Maintenance Burden	<b>Low to Moderate</b>
Land Requirement	<b>High</b>

**Figure 13-2. Pretreatment Vegetated Filter Strip Schematic**



Source: Adapted from New Jersey Stormwater Best Management Practices Manual (2021)

### Siting Considerations

- Applicable to small drainage areas and when trying to manage sheet flow.
- Best located in wide, uniformly sloped areas with ample space and mild slopes between the pollutant source and the downstream stormwater BMP.
- Locate where:
  - Area is not subject to excessive fertilizer application or excessive irrigation.
  - Site conditions promote a dense vegetative growth.
  - Site use and aesthetic considerations allow for infrequent mowing (2-4 times a year).
  - Filter strip slopes between the pollutant source and downstream BMPs are between 2% and 4%.
  - Sheet flow should be maintained across the length and width of the filter strip.
  - There is at least 18 inches of separation to seasonal high groundwater.
  - Contributing watersheds have low sediment and floatable loads.

## Design Recommendations

### Inlet

- The pretreatment vegetated filter strip should receive evenly distributed sheet flow.
- If runoff directed to a pretreatment vegetated filter strip is concentrated or could become concentrated, design the filter strip to include a level spreader in accordance with the [Inlet and Outlet Controls](#) section of Chapter 13.
- The velocity of the sheet flow should be non-erosive (less than 3 feet per second).
- Contributing upstream area should not have a slope in the direction perpendicular to flow that exceeds 2%, and a slope in the direction parallel to flow that exceeds 5%.
- The top of the filter strip (or the level spreader if using a stone-filled trench) should be set 2 inches below the adjacent pavement so that sediment and debris accumulated at the edge of the strip does not prevent runoff from exiting the pavement surface.

### Sizing and Dimensions

- Length (direction of flow). Refer to [Table 13-4](#).

**Table 13-1. Pretreatment Vegetated Filter Strip Sizing Guidelines**

Parameter	Impervious Contributing Area				Pervious Contributing Area			
	35		75		75		150	
Maximum Inflow Approach Length (feet)	35		75		75		150	
Filter Strip Slope (%)	<2	2-4	<2	2-4	<2	2-4	<2	2-4
Filter Strip Minimum Length (feet)	10	15	20	25	10	12	15	18

- Width (perpendicular to direction of flow)
  - Set width equal to or greater than the width of the upgradient contributing area.
- Slope
  - Minimum Slope: 2%; slopes less than 2% may result in ponding and other nuisances
  - Maximum Slope: 4%; slopes greater than 4% may results in concentrated flow and erosion
  - Maximum velocity for water quality storm: 1 foot per second
  - Maximum velocity for 10-year, 24-hour design storm: 3 feet per second

- If velocities are greater than the maximum velocities listed above, provide turf reinforcement matting (TRM).
- Slopes may be between 4% and 6% if TRM is provided.
- Vegetation
  - Vegetation should consist of 100% ground cover and be selected with guidance of [Appendix F](#) of this Manual based on site-specific conditions.
  - Use non-erosive vegetation that can withstand relatively high velocity flows, and both wet and dry conditions.
  - Some woody vegetation is acceptable. However, to maximize pretreatment effectiveness, most of the area should be grassed. Woody vegetation is more susceptible to re-concentration of flow than turf and other herbaceous species.
  - Manage vegetation to be thick and vigorous. Clumping vegetation should be avoided.

### Maintenance Needs

- Regular maintenance is critical for the effectiveness of vegetated filter strips, especially to ensure that concentrated flow does not short-circuit the system. Early detection and maintenance of erosion and/or head cuts is key to long-term performance.
- Inspect the vegetated filter strip and any level spreaders twice a year. Measure the depth of accumulated sediment and inspect the vegetation for erosion, bare spots, and overall health.
- Remove sediment and debris from the filter strip and level spreader, and re-seed bare spots as necessary.
- Regular, frequent mowing of the grass to a height of 3 to 4 inches is recommended.