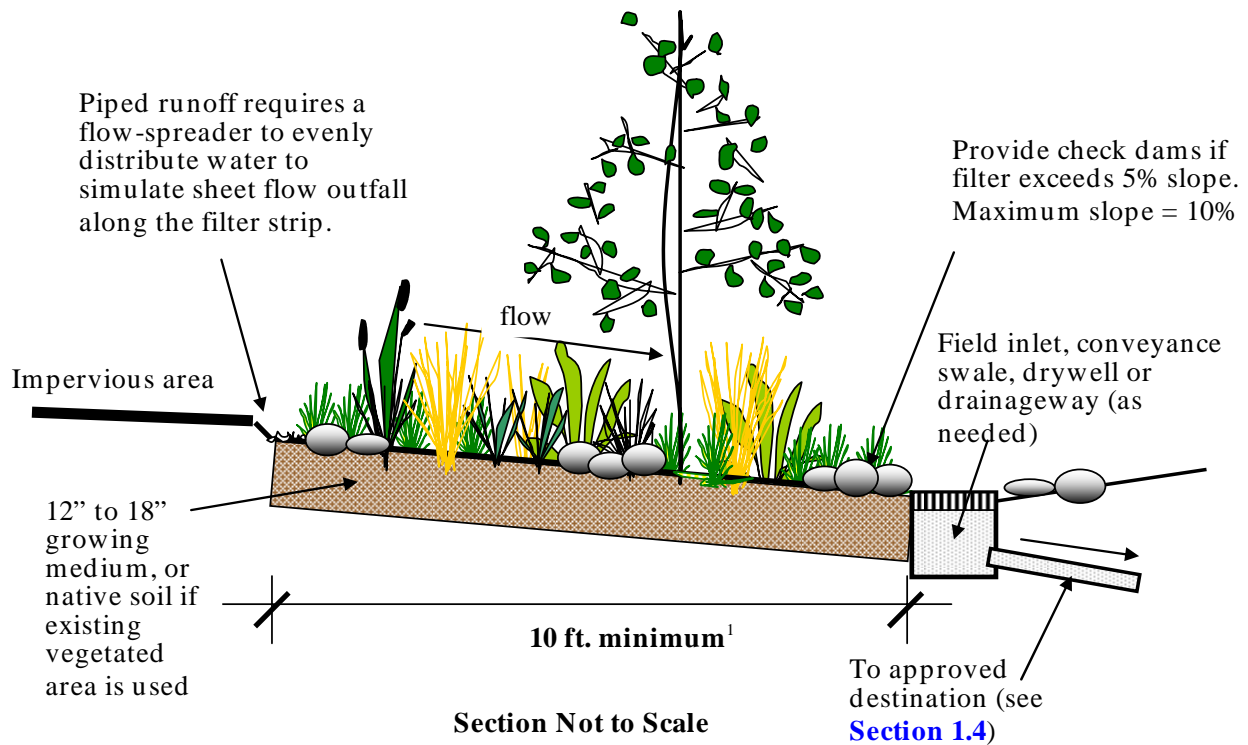


Vegetated Filter Strip

Pollution Reduction

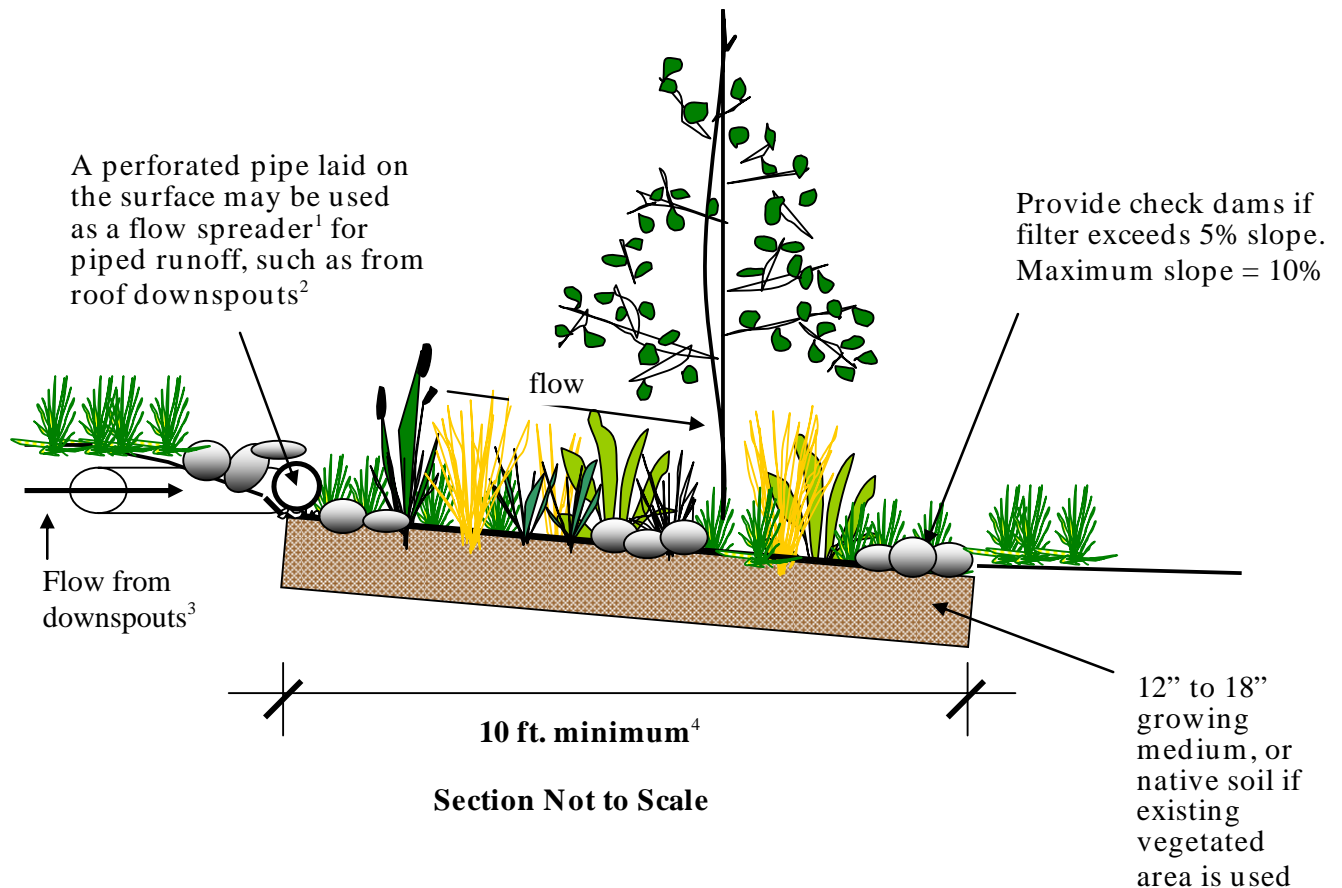


- 1) The minimum filter strip width (the distance from the impervious surface to the bottom of the vegetated filter strip) may be reduced to 5 feet for narrow lengths of impervious surfaces, such as pedestrian and bicycle paths.

<u>Stormwater Management Goals Achieved</u>	<u>Acceptable Sizing Methodologies</u>
√ Pollution Reduction.....	SIM,
√ Flow Control.....	SIM
√ Destination.....	SIM ¹
This facility is not classified as an Underground Injection Control structure (UIC).	
SIM=Simplified Approach, PRES= Presumptive Approach, PERF= Performance Approach	
Notes: Vegetated filter strips can be used to manage stormwater from rooftops, pathways, parking lots, and, potentially, streets, provided the runoff remains as an unconcentrated sheet flow or flow spreaders are installed.	
1) When located in NRCS soil types A and B, stormwater destination credit may be given for impervious pedestrian and bicycle paths less than 16 feet wide, residential development up to 1000 square feet of impervious area and commercial development up to 500 square feet of impervious area.	

Vegetated Filter Strip

Destination Design



Notes:

- 1) The perforated spreader pipe must be laid level on the ground surface along the upper edge of the filter strip so as to distribute the runoff evenly across the length of the vegetated filter strip. Stormwater shall exit the perforated pipe evenly along the length of the pipe at the ground surface.
- 2) The perforated pipe must be protected from damage and UV rays. Stones or mulch may be used to protect the perforated pipe.
- 3) The hard pipe flowing from the downspouts must be protected from damage and UV rays. The pipe may be underground, covered with rocks, or dirt may be bermed up over the pipe.
- 4) The minimum filter strip width (the distance from the perforated pipe to the bottom of the vegetated filter strip) may be reduced to 5 feet for narrow lengths of impervious surfaces, such as pedestrian and bicycle paths.

Vegetated Filter Strip



Description: Vegetated filter strips, or vegetated filters, are gently sloping areas used to filter, slow, and infiltrate sheet flow runoff. Stormwater enters the filter as sheet flow from an impervious surface or is converted to sheet flow using a flow spreader. Flow control is achieved using the relatively large surface area and for slopes greater than 5%, a generous proportion of check dams or terraces. Pollutants are removed through filtration and sedimentation. Filters can be planted with a variety of trees, shrubs, and ground covers, including grasses. Sod may be used for single-family residential sites and for filter strips along sidewalks. There are an infinite number of ways to fit this concept into site designs and designers are encouraged to use the site landscape areas for this purpose. An approved conveyance/destination method per **Section 1.4** will be required at the end of the filter.

Design Considerations: When designing vegetated filters, slopes should be kept as flat as possible to prevent erosion. Spreading the flow evenly across the filter is also important in ensuring that the facility functions correctly and avoids flow channeling.

Construction Considerations: Vegetated filter areas should be clearly marked before site work begins to avoid soil disturbance during construction. No vehicular traffic, except that specifically used to construct the facility, should be allowed within 10 feet of filter areas. Flow spreaders must be constructed perfectly level to distribute flows evenly across the filter, and for public facilities must be surveyed after construction.

Design Requirements:

Soil Suitability: Vegetated filters are appropriate for all soil types. Unless existing vegetated areas are used for the filter, topsoil shall be used within the top 12 inches of the facility, or the soil shall be amended per **Appendix G** to support plant growth.

Dimensions and Slopes: The maximum slope allowable for fully planted vegetated filter strips is 10%. The maximum slope allowable for vegetated filter strips which are planted with sod only is 5%. Terraces may be used to decrease ground slopes. Minimum slopes are 0.5%.

Setbacks: Required setback is 10 feet from structures unless lined with impermeable fabric. Easements for non-buildable areas may be required if facilities are located near property lines.

Vegetated Filter Strip

Sizing: Unless used for very long, narrow projects such as pathways and trails, vegetated filters cannot be used to manage pollution reduction flow from more than 2,000 square-feet of impervious area. Filters shall be a minimum of 10 feet wide x 10 feet long. A Simplified Approach sizing factor of 0.2 may be used to receive credit for pollution reduction and flow control. A high-flow by-pass mechanism will not be required in these cases, but a high-flow overflow may be provided at the downstream end of the filter to an approved destination point, per **Section 1.4**.

Destination Use: In A and B soils, or other soils shown to infiltrate sufficiently, vegetated filter strips which are designed per the Simplified Approach may be used to meet stormwater destination requirements for up to 1000 SF of impervious surfaces for residential projects and 500 SF for commercial projects. Minimum filter strip width may be reduced to 5 feet for narrow lengths of impervious surfaces, such as pedestrian and bicycle paths.

Check Dams: Check dams shall be constructed of durable, non-toxic materials such as rock, brick, or concrete. Check dams shall be 12 inches in length, by the width of the filter, by 3 to 5 inches in height.

Landscaping: Vegetation helps improve infiltration functions, protects from rain and wind erosion, and enhances aesthetic conditions. Grassy swale landscaping may be substituted for runoff from one and two family residential roofs and pedestrian/bicycle paths. For other projects, existing vegetation shall be enhanced such that the minimum plant material quantities per **100** square feet of facility area are as follows. The “facility area” is equivalent to the area of the filter, as calculated from Form SIM.

- 2 - Large shrubs/small trees: 3-gallon containers or equivalent.
- 6 - Shrubs/large grass-like plants: 1-gallon containers or equivalent

Ground cover plants: 1 per 18 inches on center, triangular spacing, for the ground cover planting area only, unless seed or sod is specified. Minimum container: 4-inch pot. At least 50 percent of the groundcover plantings shall be grasses or grass-like plants.

Wildflowers, native grasses, and ground covers used for City-maintained facilities shall be designed not to require mowing. Where mowing cannot be avoided, facilities shall be designed to require mowing no more than once annually. Turf and lawn areas are not allowed for City-maintained facilities; any exceptions will require City approval.

Trees: The following evergreen or deciduous trees shall be retained or planted around the perimeter of the filter strip (approximately 30 feet on center):

- Evergreen trees: Minimum height: 6 feet
- Deciduous trees: Minimum caliper: 1 ½ inches at 6 inches above base.

Vegetated Filter Strip

Checklist of minimal information to be shown on the permit drawings:

- 1) Facility dimensions and setbacks from property lines and structures
- 2) Profile view of facility, including typical cross-sections with dimensions
- 3) Growing medium specification (if applicable)
- 4) All stormwater piping associated with the facility, including pipe materials, sizes, slopes, and invert elevations at every bend or connection
- 5) Landscaping plan
- 6) Flow spreader details and specifications
- 7) Check dam or terrace details and specifications

Inspection requirements and schedule: The following table shall be used to determine which stormwater facility components require City inspection, and when the inspection shall be requested. Please note that, while not all facility components may require an inspection call, inspectors will inspect for all required components in the field.

Facility Component	Inspection Requirement
Filter grading (if applicable)	
Terraces (if applicable)	
Piping & flow spreader (if applicable)	Call for inspection
Growing medium (if applicable)	
Plantings	Call for inspection

Operations and Maintenance requirements: See Chapter 3.0.

Vegetated Filter Strip

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