

5.3 VEGETATED FILTER STRIPS

5.3.1. INTRODUCTION

Filter strips, also known as vegetated buffer strips, are vegetated sections of land superficially similar to grassy swales. One important characteristic of filter strips is that they are essentially flat with low slopes and designed only to accept runoff as overland sheet flow. A diagrammatic photograph of a vegetated buffer strip is shown in Figure 5-3. The dense vegetative cover facilitates conventional pollutant removal through sedimentation and infiltration.

There are two primary applications for vegetative filter strips. First, roadways and small parking lots are ideal locations where runoff can pass through a filter strip, rather than discharge directly to a piped conveyance system. Properly designed roadway medians and shoulders can make effective vegetated filter strips. Another application for vegetative filter strips is simply leaving land located adjacent to perimeter lots in subdivisions that will not drain via gravity to other stormwater conveyance systems in its natural condition.

Successful performance of filter strips relies heavily on maintaining shallow dispersed flow. To avoid flow channelization and maintain performance, a filter strip should contain dense vegetation with a mix of erosion resistant, soil binding species. Filter strips can be used up-gradient from watercourses, wetlands, or other water bodies, along toes and tops of slopes, and at outlets of other stormwater management structures. The most important criteria for selection and use of this practice are space and slope.

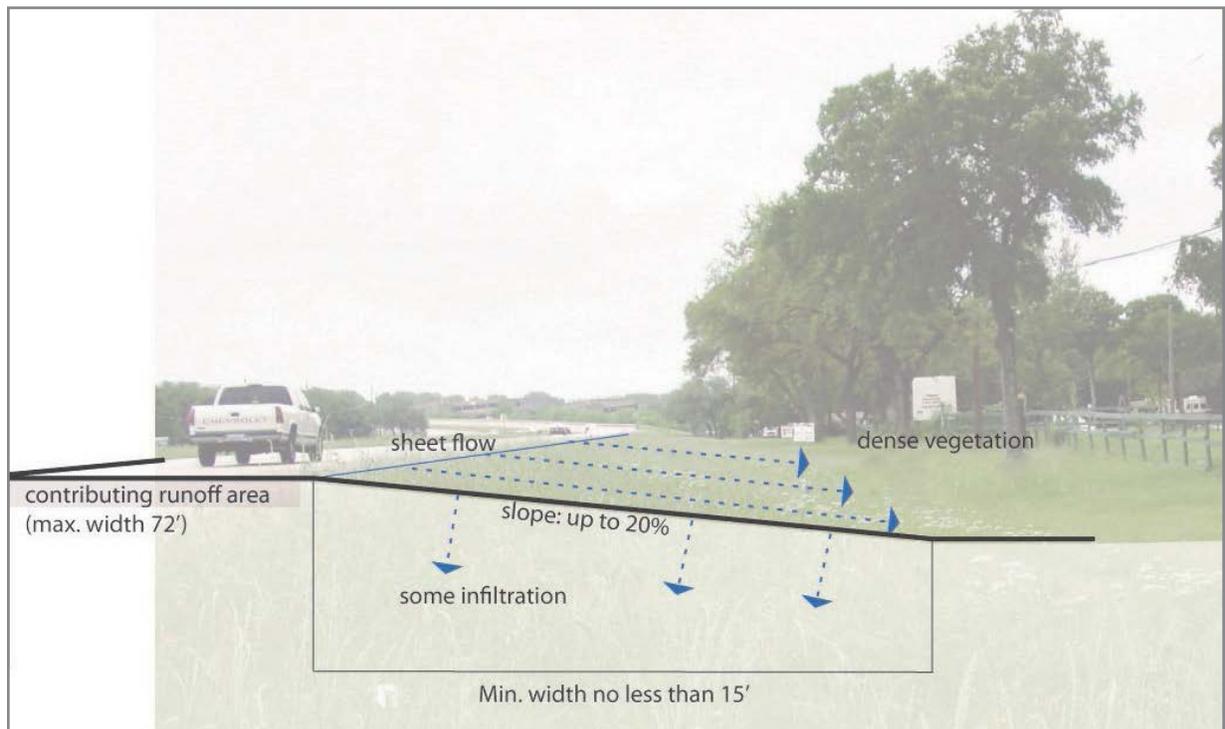


Figure 5-3: Filter strip along side of highway.

SELECTION CRITERIA

- Soils and moisture are adequate to grow relatively dense vegetative stands.
- Sufficient space is available.
- Slope is less than 20% for engineered strips.

LIMITATIONS

- Can be difficult to maintain sheet flow.
- Area required may make infeasible on some sites.

5.3.2. FILTER STRIP DESIGN GUIDANCE

Filter strips may be natural or engineered. Natural filter strips can be applied to impervious areas as noted in Figure 5-3 and to perimeter lots and other areas that will not drain by gravity to other drainage facilities on the site.

A credit is given when parking lots and roads are disconnected from the drainage system and then directed to a vegetated filter strip where it can either infiltrate into the soil or filter over it. The credit is obtained in parking lot areas and roads with a maximum flow length of 72 feet. When meeting the criteria in this section, 50% of the impervious area contributing runoff to the vegetated filter strip can be deducted from the total impervious cover (therefore, potentially gaining compliance with the Low Impact Development impervious cover levels or reducing BMP volume).

NATURAL FILTER STRIPS

1. The filter strip should extend along the entire length of the contributing area.
2. The slope should not exceed 10% for natural filter strips.
3. The minimum dimension (in the direction of flow) should be 25 feet.
4. All of the filter strip should lie above the elevation of the 2-yr, 24-hr storm of any adjacent drainage.
5. There is no requirement for vegetation density or type but diverse native vegetation of varying physical types is preferred.

ENGINEERED FILTER STRIPS

Many of the general criteria applied to swale design apply equally well to engineered vegetated filter strips. Vegetated roadside shoulders provide one of the best opportunities for incorporating filter strips into roadway and highway design, as shown in Figure 5-3. The general design goal is to produce uniform, shallow overland flow across the entire filter strip. The slope should not exceed 10% for natural filter strips.

1. The filter strip should extend along the entire length of the contributing area and the slope should not exceed 20%. The minimum dimension of the filter strip (in the direction of flow) should be no less than 15 feet. The maximum width (in the direction of flow) of the contributing impervious area should not exceed 72 feet. For roadways with a vegetated strip along both sides the total width of the roadway should not exceed 144 feet (i.e., 72 feet draining to each side).
2. The minimum vegetated cover for engineered strips is 80%.
3. The area contributing runoff to a filter strip should be relatively level so that the runoff is distributed evenly to the vegetated area without the use of a level spreader.
4. The area to be used for the strip should be free of gullies or rills that can concentrate overland flow.
5. The top edge of the filter strip along the pavement will be designed to avoid the situation where runoff would travel along the top of the filter strip, rather than through it.
6. The top edge of the filter strip should be level, otherwise runoff will tend to form a channel in the low spot.
7. Filter strips should be landscaped after other portions of the project are completed.

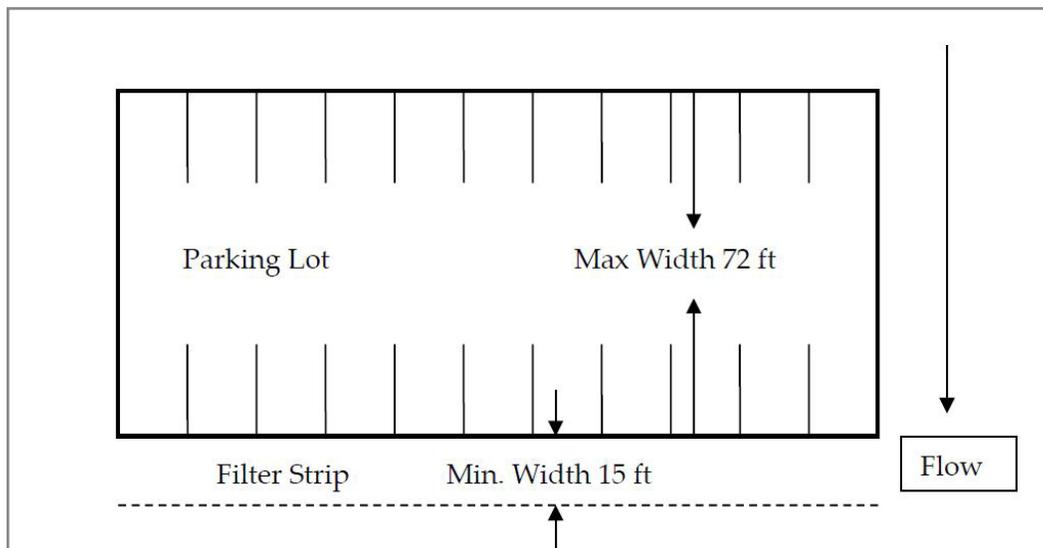


Figure 5-4: Example configuration of filter strip adjacent to a parking lot.

5.3.3. MAINTENANCE REQUIREMENTS

Once a vegetated area is well established, little additional maintenance is generally necessary. The care and maintenance a vegetated feature receives in the first few months after it is planted is key to establishing long-term viability. Once established, all vegetated facilities require some basic maintenance to ensure the health of the plants including:

- **Seasonal Mowing and Lawn Care.** Grass height should be limited to 18 inches and mowed regularly. If native grasses are used, the filter may require less frequent mowing. While weeds should be removed, herbicide use should be kept to a minimum. Irrigation can help assure a dense and healthy vegetative cover.
- **Sediment Removal.** Sediment removal is not normally required in filter strips, since vegetation grows through sediment and binds it to the soil. However, sediment may accumulate along the upstream boundary of the strip and prevent uniform overland flow. Excess sediment should be removed by hand or with flat-bottomed shovels.
- **Grass Reseeding and Mulching.** A healthy dense grass should be maintained. Dense vegetation may require irrigation immediately after planting and during particularly dry periods.