

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

FILTER STRIP

**(Acre)
Code 393**

DEFINITION

A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and waste water.

PURPOSE

To remove sediment and other pollutants from runoff or waste water by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization, thereby reducing pollution and protecting the environment.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies: (1) on cropland at the lower edge of fields or above conservation practices such as terraces or diversions, or on fields adjacent to streams, ponds, and lakes; (2) in areas requiring filter strips as part of a waste management system to treat polluted runoff or waste water; (3) on forest land where filter strips are needed as part of a forestry operation to reduce delivery of sediment into waterways; and (4) in areas adjacent to urban, residential or industrial locations.

PLANNING CONSIDERATIONS

Evaluate type and quantity of pollutant, slopes and soils, adapted vegetative species, time of year for proper establishment of vegetation, necessity for irrigation, visual aspects, fire hazards, and other special needs like wildlife plantings and social concerns. Prevent erosion where filters outlet into streams or channels. If filter strips are to be used in treating waste water or polluted runoff from concentrated livestock areas, the following must be considered:

1. Adequate soil drainage to ensure satisfactory performance.
2. Provisions for preventing continuous or daily discharge of liquid waste unless the area is adequate for infiltrating all daily applied

effluent. Temporary storage should be considered to prevent discharge to the filter strip more frequently than one every 3 days.

3. Enough rest periods to maintain an aerobic soil profile. Storage or alternating filter strips may be desirable.

4. An adequate filter area and length of flow to provide the desired reduction of pollutants. A serpentine or switchback channel can be used to provide greater length of flow.

5. Provisions for excluding roof water and unpolluted surface runoff.

6. Slopes less than 5 percent are more effective; steeper slopes require a greater area and length of flow.

7. Provisions for mowing and removing vegetation to maintain the effectiveness of the filter area. While not generally recommended, controlled grazing may be satisfactory when the filter area is dry and firm.

8. The need for a level lip weir, gated pipe, sprinklers, or other facilities to distribute flow uniformly across the top of the filter strip and maintain sheet flow through the strip.

Filter strips by themselves will not meet the "no-discharge" requirement applicable to livestock operations requiring permits under the National Pollutant Discharge Elimination System. More stringent pollution abatement measures may also be necessary where receiving waters must be highly protected.

DESIGN CRITERIA

Filter strips for sediment and related pollutants. These criteria apply to filter strips on cropland at the lower edge of fields, on fields, on pastures, or in manure spreading areas adjacent to streams, ponds, and lakes, and above conservation practices such as terraces or diversions.

The length of flow through vigorous vegetation shall be at least 10 ft for slopes of less than

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resource Conservation Service.

one percent and proportionately up to at least 25 ft for 30 percent slopes.

Filter strips for runoff from concentrated livestock areas. These criteria apply to filter strips for feedlot and barnyard runoff.

A settling basin, vegetated barriers, or low velocity channel shall be provided between the waste source and filter strip when more than one hundred 1,000-pound animal units are confined. Such facilities should be considered for use with all filter strips.

A constructed settling basin, if needed, shall have sufficient capacity, as a minimum, to store the runoff computed for 15 minutes' duration at the peak inflow rate resulting from 2-year, 24-hour rainfall. Any basin outflow shall be disregarded in computing minimum storage. Additional storage capacity, based on frequency of cleaning, shall be provided for manure and other solids settled within the basin. When the basin is cleaned after every significant runoff event, additional storage equivalent to at least 0.5 in. from the concentrated waste area shall be provided. If only annual cleaning of the basin is planned, additional storage equivalent to at least 6 in. from the concentrated waste area shall be provided.

A low velocity channel shall be minimum of 75 ft long. It shall be designed for a flow depth of 0.5 ft or less to pass the peak flow resulting from a 2-year, 24-hour rainfall at a velocity of 0.5 ft per second or less. Provisions shall be provided for removing settled solids from the channel as necessary to maintain proper functioning.

A filter strip may be a relatively uniform grass area or grass waterway. Minimum dimensions shall be based on the peak outflow from the concentrated waste area or settling facility based on a 2-year, 24-hour rainfall.

Grass area filter strips shall be generally on the contour and sufficiently wide to pass the peak flow at a depth of 0.5 in. or less. Flow length shall be sufficient to provide at least 15 minutes of flow-through time.

Grass channel filter strips shall be designed to carry the peak flow at a depth of 0.5 ft or less. Flow length shall be sufficient to provide at least 30 minutes of flow-through time. Grass species and shape of channel shall be such that grass stems will remain upright during design flow.

Filter strips for controlled overland flow treatment of liquid wastes. These criteria apply to filter strips for waste water from milk parlors, milking centers, waste treatment lagoons, food processing plants, and animal waste storage facilities.

Overland flow filter strips shall be installed on natural or constructed slopes of 2 to 6 percent. They shall have minimum flow lengths of 100 ft on 2 percent slopes and proportionately up to 300 ft on 6 percent slopes. Weekly waste water application rates should not exceed 6 in. and should be only 1 or 2 in. for highly concentrated wastes. Daily application times should not exceed 6 hours, and should be decreased to 2 hours for more concentrated wastes such as that from animal waste storage facilities. Filter strips should be rested at least 2 days each week.

Filter strips on forest land. These criteria apply to filter strips for runoff as part of a forestry operation to reduce delivery of sediment into waterways.

As a guide, the length of flow through undisturbed forest floor should be at least 25 ft for slopes of less than one percent and proportionately up to at least 65 ft for 30 percent slopes and at least 150 ft for 70 percent slopes. Longer flow lengths should be used as contributing drainage areas increase.

OPERATION AND MAINTENANCE

Development of rills and small channels within filter areas must be minimized. Needed repairs must be made immediately to reestablish sheet flow. A shallow furrow on the contour across the filter can be used to reestablish sheet flow. Vegetation must be maintained in a vigorous condition. If livestock have access to the filter area, it must be fenced to control grazing.

PLANS AND SPECIFICATIONS

Plans and specifications for filter strips shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

FILTER STRIP SPECIFICATIONS**ENGINEERING SPECIFICATIONS**

All trees, stumps, brush, rocks, and similar materials that can interfere with installing the filter strip shall be removed. The materials shall be disposed of in a manner that is consistent with the standards for maintaining and improving the quality of the environment and with proper functioning of the filter strip.

The filter strip shall be shaped to the grade and dimensions shown on the plan or as staked in the field. If necessary, topsoil shall be stockpiled and spread to the required grade and thickness. Excess spoil shall be disposed of in areas where it does not interfere with the required flow characteristics of the filter strip.

VEGETATIVE SPECIFICATIONS GUIDE

For species selection, see table Conservation Plants and Their Uses (USDA-NRCS, P.R. & USVI), filed in Section II of the FOTG. Specify methods of seedbed preparation; adapted plants, planting dates and rates of seeding or sprigging; need for mulching, use of a stabilizing crop, or mechanical means of stabilizing; and fertilizer, soil amendment, and weed control requirements. Specify requirements for maintenance.