

**PRIMARY USE:** Erosion control.

**ADDITIONAL USES:** Safe disposal of runoff water; Improved water quality; Improved wildlife habitat; Reduced sediment damage; Improved landscape aesthetics.

## GRASSED WATERWAYS

**What is it?** A grassed waterway is a natural or constructed channel established in suitable vegetation for safe water disposal.

### Purpose

When trying to reduce the possibility of severe gully erosion, grassed waterways provide a helpful solution. They force storm runoff water to flow down the center of an established grass strip that can carry very large quantities of storm water across a site without erosion.



**Grassed Waterways  
Perspective View**

### Limitations

Waterways should generally have less than 5 percent slopes, suitable soils for vegetation, and adequate area for installation. It is critical during the vegetative establishment period to restrict outside water from flowing through the channel. Therefore, it may be necessary to delay construction until the waterway is well established. Grass waterways are also used as filters to remove sediment, but may sometimes lose their effectiveness when too much sediment builds up in the waterways.

### Materials

Proper vegetation, and earth.

### Installation

If water quality or protection of riparian vegetation (streambank) is an issue, the outlet end may need to widen significantly or another buffer or filtering type practice may be necessary.

**Source:** [NRCS National Handbook of Conservation Practices](#); [NRCS Planning and Design Manual](#), NRCS.

## GRASSED WATERWAYS

### **Additional Information:**

Generally, grassed waterways should be located to conform with and use the natural drainage system. Waterways may also be developed along roadways and property lines but should avoid sharp changes in direction and grade. Waterways may be trapezoidal, parabolic, or triangular “V” shaped. The waterway installation must assure that the runoff from the waterway does not cause gullies and/or overfalls to develop.

### Vegetation

The most critical time in successfully installing grassed waterways is when vegetation is being established. The disturbed area of the waterway should be seeded and mulched within 10 days of excavation and shaping work. Special protection such as mulch anchoring, straw or hay bale dikes, or other protective methods are warranted at this critical period. Supplemental irrigation may also be needed to establish quality vegetation.

### Timing

The vegetation should be well established before large flows are permitted in the channel unless special provisions are taken:

1. Special protection such as mulch anchoring, hide-a-bale dikes, or other suitable methods are used during the vegetation establishment period and,
2. There is strong assurance that initial establishment period maintenance will be provided.

### Sediment protection

Where disturbed soil from construction areas contribute runoff and sediment directly to the waterway, a 20 ft (6 m) vegetative filter should be placed along side of the grassed waterway to filter out sediment.

### Wet soil condition

When a prolonged wet soil condition exists which would inhibit growth of desired vegetation and make mowing maintenance difficult, consideration should be given to installation of a subsurface drain practice for removal of excess water.

## GRASSED WATERWAYS

### **Design Criteria:**

When a construction or urban drainage area exceeds 10 acres (4 hectares), it is recommended that the grassed waterway be designed by an engineer experienced in waterway design.

#### Capacity

The minimum capacity for a grassed waterway shall be that required to convey the peak runoff expected from a storm of 10-year frequency, 24-hour duration. When slope is less than 1 percent, out of bank flow may be permitted if such flow will not cause excessive erosion or cause damage to houses, buildings, or other important features.

#### Velocity

Design velocities shall be calculated using Manning's formula and standard procedures for determining "n" values of tall and short grasses. Design velocities with mature vegetation in grassed waterways shall not exceed 5 ft/s (1.5 m/s). Good vegetal cover, mulch netting, temporary gully barriers, and proper maintenance will be needed to establish and maintain waterways having velocities approaching 5 ft/s (1.5 m/s).

#### Width

Grassed waterways may be parabolic, trapezoidal, or "V" shaped. The bottom width of trapezoidal waterways shall not exceed 50 ft (15 m) unless multiple or divided waterways or other means are provided to control meandering of low flows.

#### Side Slopes

Side slopes shall not be steeper than a ratio of three horizontal to one vertical to facilitate use of mowing and maintenance equipment. Side slopes of 4:1 or flatter are recommended.

#### Depth

The minimum depth of a waterway that receives water from other tributary channels shall not create backwater in that channel when both are flowing at design depth. A minimum of 0.3 ft (91 mm) shall be added to the design depth for freeboard.

#### Drainage

Subsurface drains, underground outlets, stone center waterways, or other suitable measures shall be provided for in the design for sites having prolonged flows, a high water table, or seepage problems. Water-tolerant vegetation such as reed canarygrass may be an alternative on some wet sites.

#### Outlets

All grassed waterways shall have a stable outlet with adequate capacity to prevent ponding or flooding damage. The outlet can be another vegetated channel, an earth ditch, a grade stabilization structure, or other suitable outlets.

#### Establishment of Vegetation

Grassed waterways will be vegetated according to practice standard for seeding and mulching.

#### Maintenance

A maintenance program shall be established to maintain waterway capacity, vegetative cover, and the outlet. Vegetation damaged by traffic, herbicides, or erosion must be repaired promptly.