Level Spreaders

Source: Umstead Coalition, 2005

BENEFITS

	L	M	H
Flow Control	■	■	■
Erosion Control			
Sediment Control			
Runoff Reduction			
Flow Diversion	■	■	

Description: A level spreader is a low-cost method to convert small volumes of concentrated runoff into sheet flow and release it onto an area stabilized by existing vegetation.

Typical Uses: Level spreaders are commonly used at the outlet of a diversion structure or sediment removal structure to convert concentrated flow to uniform sheet flow prior to releasing the runoff onto stabilized downstream slopes. Level spreaders are also used to convey runoff from impervious surfaces, such as parking lots, onto vegetated areas or into detention basins.

Advantages:

- Widely used BMP due to ease of installation and availability of materials.
- Low cost and simple to construct.

Limitations:

- Flows from a level spreader should be limited to clean, diverted runoff, or runoff that has been passed through a sediment removal structure.
- The downstream slope must have existing vegetation and be capable of accepting sheet flow without incurring erosion.
- May require adjustment after freeze-thaw cycle due to heaving.

Longevity: One year

SUDAS Specifications: Refer to Section 9040, 2.08 and 3.12

A. Description/Uses

A level spreader is a device used at the outlets of dikes and berms to convert the concentrated flows to sheet flow prior to discharging the flow onto a vegetated area downstream of the disturbed site.

A level spreader normally consists of a shallow excavation that serves as a stilling basin to allow runoff to pond up and dissipate its kinetic energy. An overflow weir is constructed to release the accumulated runoff. This weir is normally constructed from a 2 by 8 inch pressure-treated wooden timber placed at 0% grade to ensure uniform flow over the weir. For low flow applications, an earthen weir may also be constructed; however, special attention must be paid to ensure that the weir is level. If low points exist, concentrated flows will result and these could cause damage to the weir and the downstream slope.

B. Design Considerations

The grade of the last 20 feet of the diversion structure channel should be 1% or less to slow the velocity of the flow prior to draining into the depression. This will help reduce turbulence and erosion within the depression.

It is imperative that the receiving area downstream of the weir be stabilized sufficiently to receive the flows from the spreader without causing erosion. The receiving area must also be smooth to preserve the sheet flow and prevent the flow from concentrating. The slope of the receiving area should be less than 10%.

For level spreaders constructed from earthen embankments, a layer of erosion control matting should be placed on either side of the weir to provide additional stability to the surface.

C. Application

The length of the weir and depth of the depression required behind the weir are dependent on the anticipated flows over the weir. Select the length and depth of the spreader from Table 7E-9.01 based upon the 10 year peak flow.

Table 7E-9.01: Level Spreader Properties

Flow (cfs)	Min. Depth (feet)	Min. Length (feet)	Material
0-4	0.5	10	Stabilized Earth
5-10	0.5	10	2” x 8” Timber
10-20	0.6	20	2” x 8” Timber
20-30	0.7	30	2” x 8” Timber
30-40	0.8	40	2” x 8” Timber

D. Maintenance

The downstream slope should be inspected for signs of rilling. If rilling occurs, the length of the spreader may need to be increased, or additional stabilizing practices may need to be employed on the slope. If silt accumulates within the depression, it should be cleaned out when it loses one-third of its volume.

After a freeze-thaw cycle, the level spreader should be inspected to ensure that heaving has not occurred. Any displacement should be corrected to ensure that it is completely level.

E. Time of Year

Level spreaders will function on a year-round basis.

F. Regional Location

For soils that are highly sensitive to erosion, even when fully vegetated, the length of the spreader may need to be increased beyond that shown in the table.

Figure 7E-9.01: Typical Level Spreader Configuration
(SUDAS Specifications Figure 9040.109)