

Tree Check Dams (Swale)

Description Open channel conveyance systems such as dry swales often incorporate check dams to slow runoff and prevent erosion, when longitudinal slopes range from 2% to 6%. Traditional check dams are constructed of rock, railroad ties, or other material. Tree check dams (Figure 28) use tree mounds (Figure 24 on page 31) to dissipate velocity. Tree check dams may also increase evapotranspiration and pollutant removal in the swale soils.

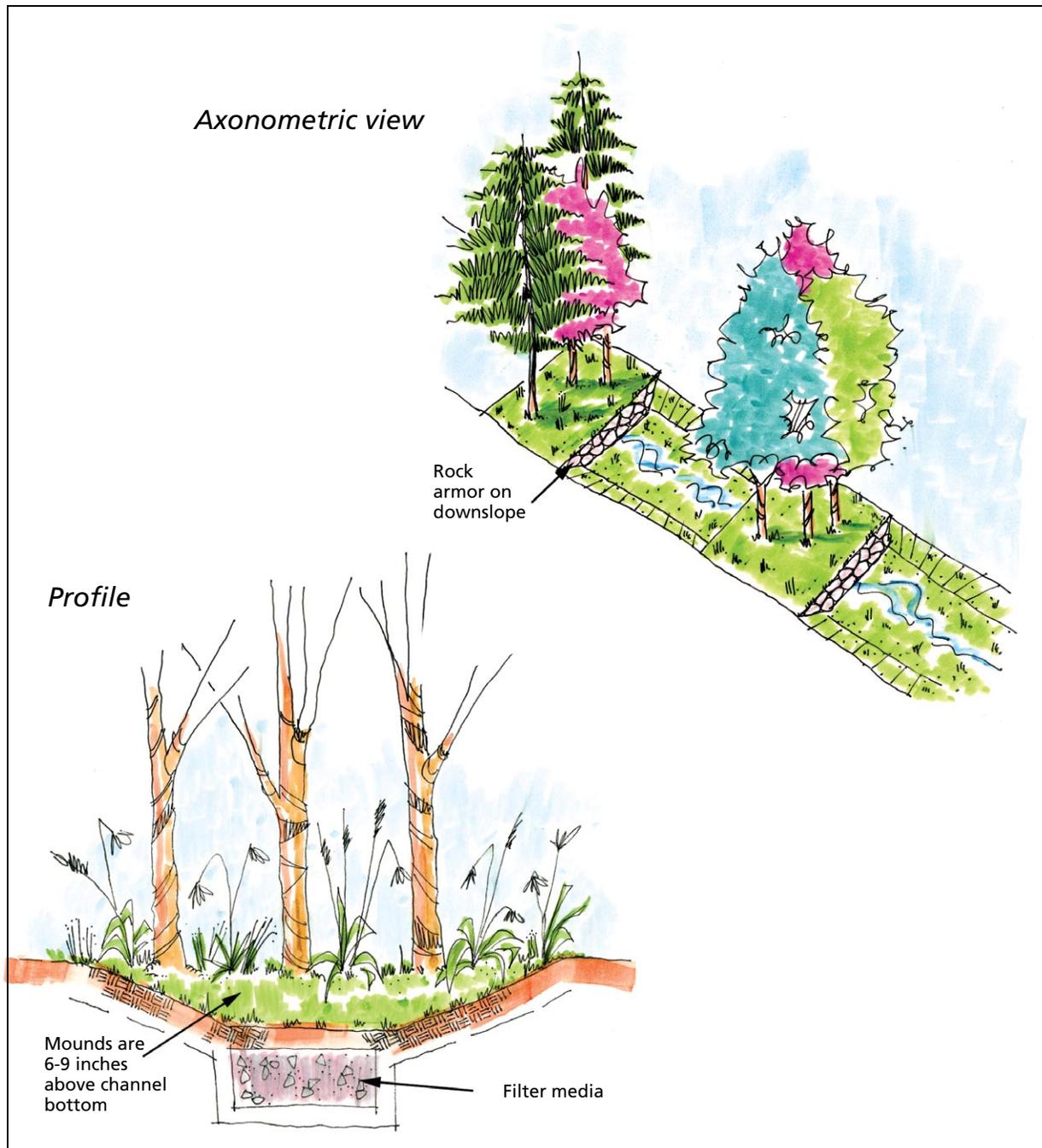


Figure 1. Tree check dams slow runoff and prevent erosion in swales with slopes of 2% to 6%.

Design Modifications Account for increased roughness and reduced capacity by subtracting the cross-sectional area of trees from the channel cross-section when computing channel capacity.

Species Selection Species selection is key because it is more efficient than trying to change the site characteristics. Select a diverse mix of hardy, native species that are adapted to soils and site conditions.

In particular, consider the size of trees at maturity in relation to channel width. Trees that are too large may block flow across the channel, so small trees and shrubs may be best for check dams. Other desirable species may have these characteristics:

- Tolerant of inundation
 - Tolerant of salt
-

- General Planting Guidance***
- Spacing of check dams should be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.
 - Check dam mounds should be no higher than 6-9 inches above the bottom (invert) of the channel.
 - The mound should be constructed across the entire width of the channel, and have a weep hole or armored opening to allow ponded water to seep through the mound. Mounds should be armored with rock on the downslope side, particularly on steeper slopes, to protect from erosion.
 - Excavate to a depth of 3-4 feet and backfill with amended soil if existing soil is compacted.
 - Plant trees and shrubs on the mounds, using bare root seedlings to minimize transplant stress to roots.
 - Plant turf grass or native grasses (if able to withstand the runoff velocity the swale is designed to convey) along the channel bottom and side slopes.
-

- Maintenance***
- Use mulch to retain moisture.
 - Periodically remove debris and trash from the check dams.
 - Use mulch, tree shelters, or rock to protect the tree from lawnmower damage.
 - Mow turf regularly or native grasses twice a year.
-

<i>Topics for Future Research</i>	<input type="checkbox"/>	Will tree mounds be stable enough to withstand high flows?
	<input type="checkbox"/>	Should larger stock be used to prevent seedlings from washing away?
	<input type="checkbox"/>	Is there potential for trees to shade out grass and contribute to erosion?
	<input type="checkbox"/>	What species can be planted on the channel bottom and around trees as an alternative to turf that can also withstand the runoff velocity the swale is designed to convey?
	<input type="checkbox"/>	Can dimensions of tree mounds be further defined?

<i>Further Resources</i>	Center for Watershed Protection. 1996. Design of stormwater filtering systems. Ellicott City, MD.
	Metro. 2002. Green streets: innovative solutions for stormwater and stream crossings. Portland, OR.

This fact sheet was excerpted from:

Cappiella, Karen; Schueler, Tom; Wright, Tiffany. 2006. Urban Watershed Forestry Manual. Part 2: Conserving and Planting Trees at Development Sites. NA-TP-01-06, Newtown Square, PA: p 40-42. USDA Forest Service, Northeastern Area State and Private Forestry.

This information was developed by:

Center for Watershed Protection
8390 Main Street, 2nd Floor
Ellicott City, MD 21043
www.cwp.org

and

USDA Forest Service
Northeastern Area State and Private Forestry
11 Campus Boulevard, Suite 200
Newtown Square, PA 19073
www.na.fs.fed.us

