

Lake Wise Info Sheet



Shoreland Best Management Practices for Lake-friendly Living.

Benefits

-  Water Quality
-  Prevents Erosion
-  Slow, Spread, Sink Stormwater
-  Small spaces
-  Low Cost
-  Low Maintenance
-  Protection & Resiliency

Acceptable BMP under the Vermont Shoreland Protection Act

Related Info Sheets:

Turnouts & Rock Aprons
Driveways & Lake Roads
Planning Pathways

WATER BARS & OPEN-TOP CULVERTS

Low impact lake access



Description.

Diagonal channels across driveways or pathways that intercept storm-water runoff and divert it to a stable treatment area.

VT Lake Wise

<Water bars, ^Open-top culvert and rock apron.

Applicability.

Water bars and open-top culverts prevent the volume and velocity of stormwater flow from increasing and eroding the surface of unpaved roads, driveways, or pathways by regularly directing runoff to stable areas for absorption and preventing sediment from entering the lake. Open-top culverts are structurally stronger, but water bars are easier to construct. Both are not recommended for roads or driveways that are plowed, unless it is done after the ground freezes and very carefully.

How to:

1. Identify the area on a pathway or driveway where water bars or open-top culverts will be installed and measure the grade change. Refer to the table to determine the appropriate spacing required for your site. Select the ideal locations where the water runoff can be directed to relatively flat, stable, and/or densely vegetated areas. Mark the locations.
2. Mark a trench at a 30-degree angle down the slope across the road or path, directing runoff to the downslope side. Make sure to extend the trench past the path or road edge on both sides.

Water Bar Spacing Guide.

Slope (%)	Spacing (feet)
<5	125
5-10	100
10-20	75
20-35	50
>35	25

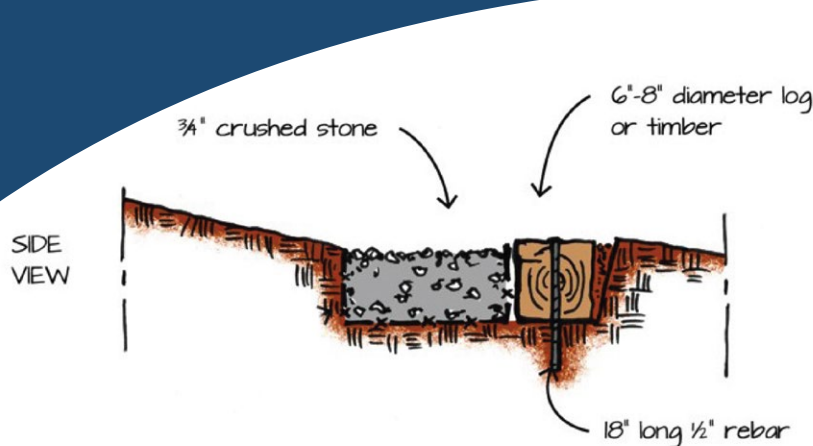
Adapted from The VT Standards & Specifications for Erosion Prevention & Sediment Control



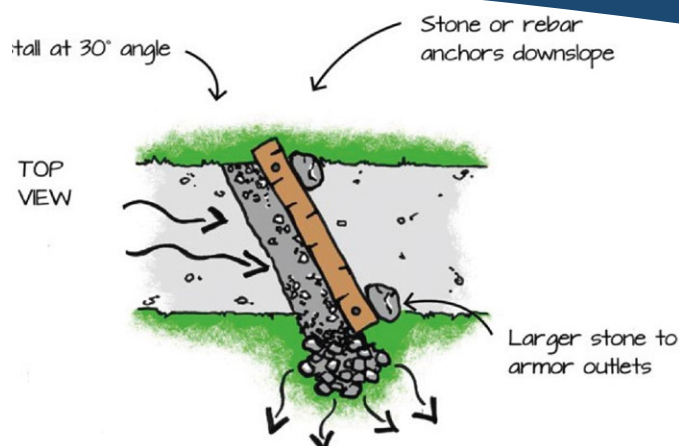


WATER BARS & OPEN-TOP CULVERTS

Low impact lake access



Section view of water bar with timber and rebar.



Plan view of water bar at angle with stone outlet.

VT Guide to Stormwater Management

How to: water bars.

3. Select rot resistant logs or pressure-treated timber at least 6 to 8 inches in diameter. Rot resistant lumber such as White or Red Cedar, Black Locust, White Oak, or Black Cherry will considerably extend the life of the structure.
4. Trench depth is dependent on the height of the timber. The top of the timber should be almost flush with the ground surface on the downhill side and snug to the bottom of the trench with no voids. Trench width will include the width of the timber and an additional 12 inches extending uphill that is about 6 inches deep. Soil and rock excavated from the trench can be piled on the ground below the water bar to be used later as backfill.
5. Install the log or timber along the downslope side of the trench. Extend the timber beyond the edge at both ends. Secure the timber with large stones, rebar pins, or wooden stakes. If using stones, partially bury them on the downhill side. If using rebar, drill 1/2 inch holes 6 inches in from each end and pound in 18-inch pieces of rebar until the rebar is flush or slightly recessed from the top.
6. Fill the 12-inch wide and 6-inch-deep trench along the uphill side of the timber with clean crushed stone, leaving a few inches of the timber exposed.
7. Place a flared apron of stones to armor the water bar outlet and ensure the it will drain to a stable vegetated or stone armored treatment area.
8. Pack soil and gravel up against the downhill side of the water bar so that the top is flush with the path. Cover all disturbed soil with seed and mulch or leaf litter to prevent erosion.

Materials.

- ✿ Measuring tape, stakes, and string to measure grade
- ✿ Spray paint or string to mark locations
- ✿ Shovel, rake
- ✿ Drill (if needed)
- ✿ Sledgehammer (if needed)
- ✿ Rot-resistant logs or timbers or pressure-treated lumber
- ✿ Crushed stone for outlet
- ✿ Grass seed (if needed)
- ✿ Mulch (if needed)

For water bars:

- ✿ Washed crushed stone
- ✿ Rebar or large stones

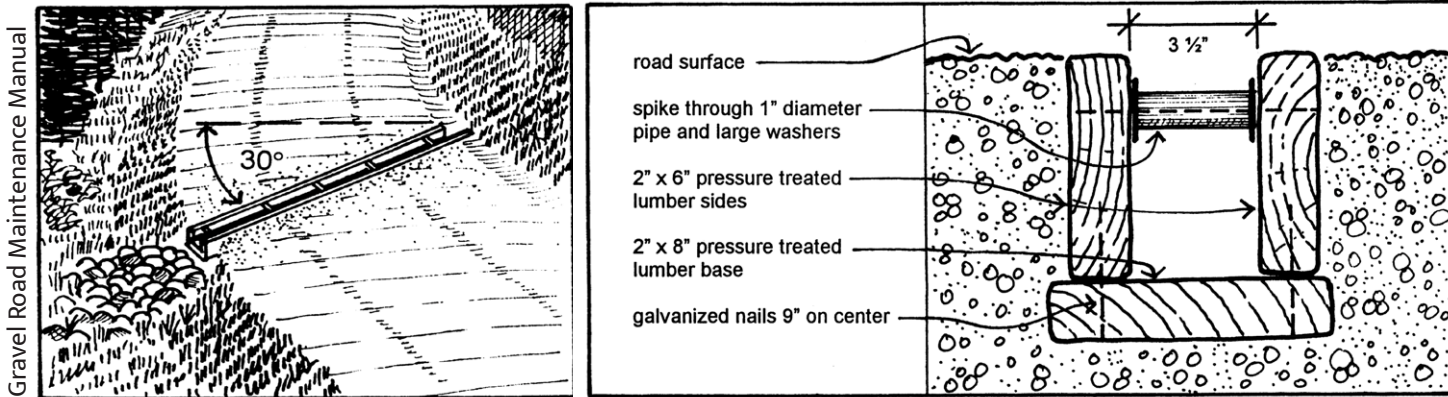
For open-top culverts:

- ✿ 3" galvanized nails
- ✿ Spacers made of 1 inch pices of wood or 1 inch metal pipe with washers and rebar





Make sure the open-top culvert is flush with the surface; if placed too high, stormwater runoff will not enter; if placed too low, it will quickly fill up with road material and sediment.



Perspective and section-view diagrams depicting open-top culvert placement and materials.

How to: open-top culverts.

3. Construct the wood frame. Select pressure treated lumber or cedar timbers; pressure treated lumber will extend the life of the structure. Assemble three boards using a 2-inch by 8-inch lumber base with two 2-inch by 6-inch sides. Make sure the length of the structure will extend beyond the edge of the path or road. Secure the wood together with 3-inch galvanized nails and insert spacers along the top of the culvert to strengthen the construction. Construct the spacers with 1-inch wide pieces of wood cut to size and galvanized nails or 1-inch wide pieces of pipe and washers with spikes driven through the center.
4. Dig the trench so that the constructed culvert is flush with the ground surface with no gaps, about 8 inches deep and wide, as shown in the diagram. Make sure the top of the culvert is flush with the road surface - not too high or too low or it will not function properly.
5. Install the culvert, extending the outlet beyond the edge of the path or road. Backfill around the culvert to bring the ground surface flush to the top of wood.
4. Place a flared apron of stones to armor the culvert outlet and ensure the culvert will drain to a stable vegetated or stone armored area to prevent erosion and allow for infiltration. Cover all disturbed soil with seed and mulch or leaf litter to prevent erosion.

Maintenance.

Periodically remove accumulated debris and sediment from the water bar or open-top culvert. Inspect the installations after large rain events and in the spring. If erosion has occurred, stabilize the area, and fill any eroded spots. Ensure no undercutting or bypasses have occurred.

For more information...

- Gravel Road Maintenance Manual: A Guide for Land-owners on Camp and Other Gravel Roads (2016)
- The Vermont Guide to Stormwater Management for Homeowners and Small Businesses (2018)

