Water Bar

A water bar intercepts runoff traveling down moderately steep walkways, paths, gravel driveways, and other areas and diverts it into stable vegetated areas to reduce erosion.

Sizing and Design

STEP 1. Determine slope. Find the slope of the land where the water bars will be located. Follow the steps below to determine slope.

a. Place one stake at the uphill end of the slope and another at the downhill end (Figure 1).

Figure 1

b. Tie a string to the uphill stake at ground level. Use a string level to level the string between the two stakes.

c. Measure the length of the string between the stakes. This is the run or length.

d. On the downhill stake, measure the height from the ground to the string. This is the rise or height.

e. Divide the rise by the run and then multiply the result by 100. This is the slope.
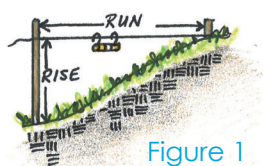
$$\text{SLOPE (\%)} = (\text{RISE} \div \text{RUN}) \times 100$$

STEP 2. Determine how many water bars are needed.

a. Compare your percent slope to the waterbar spacing in Table 1 to determine how far apart the water bars should be.

b. Divide the length of your path by the spacing between water bars from Table 1 to get the number of water bars that you will need. Round to the nearest whole number.

$$\text{LENGTH OF PATH} / \text{WATER BAR SPACING} = \text{\# WATER BARS}$$

EQUIPMENT & MATERIALS

- Measuring tape
- Shovels
- Saw
- 6" x 6" pressure treated or other rot-resistant timbers or logs
- two 18" lengths of $\frac{1}{2}$" steel rebar (per water bar)
- $\frac{3}{4}$" crushed stone
- Mulch

Table 1. Suggested water bar spacing.

Percent Slope	Spacing between water bars (ft)
2%	250
5%	130
10%	80
15%	50
25% +	40

TIP: Alternatively, you can place the waterbars to target erosion prone areas.

STEP 2. **Determine material needs.**

Timbers or Logs: Water bars should be installed at about a 30 degree angle to the path and should extend 6" off both sides of the path. Measure the width of your path at the angle you intend to install them. To determine the length of timbers or logs you will need, multiple the number of water bars by the width of the path plus 1 foot.

NUMBER OF WATER BARS x (PATH WIDTH + 1ft) = TIMBER LENGTH (ft)

Crushed Stone: Each bar should have a trench about 12" wide and 6" deep along the entire uphill length and an apron, or small dry well, at the outlet end. Allow about 1 cubic foot for the apron for each bar. To determine the volume of crushed stone needed, multiply the number of steps by the volume needed for each step using the equation below (assumes a 12" wide and 6" deep trench). If needed, multiply the result by 0.037 to convert cubic feet to cubic yards.

$[1\text{ft}^3 + (0.5\text{ft}^2 \times \text{LENGTH OF BARS IN FEET})] \times \text{NUMBER OF BARS} = \text{CRUSHED STONE NEEDED}(\text{ft}^3)$

INSTALLATION

STEP 1. **Dig.** Dig a trench for the wood timber or log that is at approximately a 30° angle across the path. The trench should be deep enough so the top of the timber or log will be almost flush with the trail on its downhill side once in place. Be careful to dig only as deep as needed to set the timber to make sure that the soil under the water bar is stable. Store soil and rocks excavated from the trench on the trail below the water bar to be used later to backfill the trench (Figures 1 and 2).

STEP 2. **Prepare timbers.** Prepare materials by cutting the timbers or logs to the appropriate length according to the design. Many lumber suppliers will cut them to length for you. Remember that each timber should extend 6" on each side. Drill $^1/_2$" diameter holes approximately 6" from the ends of each timber.
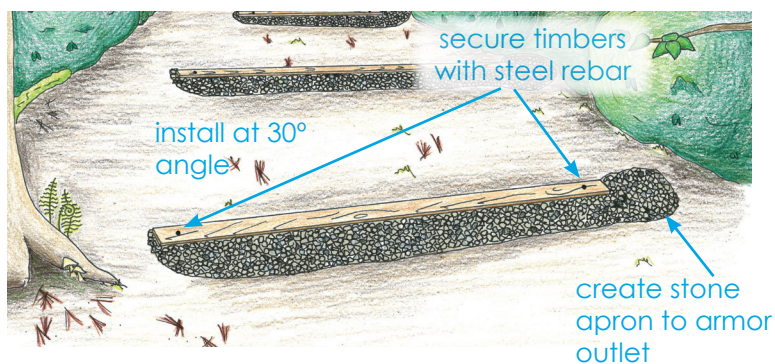

Figure 1. Top view of waterbar.

- install at 30° angle
- secure timbers with steel rebar
- create stone apron to armor outlet

STEP 3. **Install timbers.** Install the timber or log by placing it snug against the downhill side of the trench. The timber should be level and have no high points or voids under it.

STEP 4. **Secure timbers.** Secure the timber with rebar stakes making sure that the rebar is pounded down to be flush or slightly recessed with the top of the timber to avoid any sharp edges.
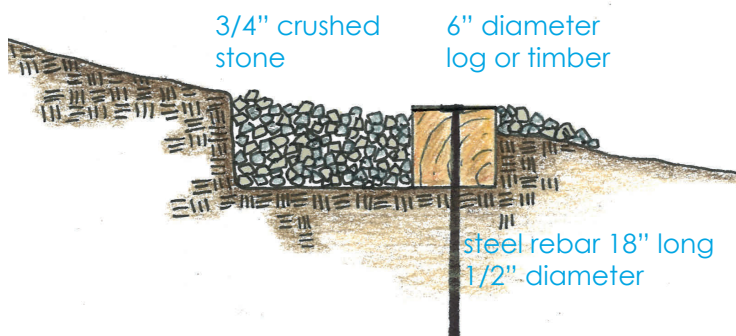

- 3/4" crushed stone
- 6" diameter log or timber
- steel rebar 18" long 1/2"-diameter

Figure 2. Side view of waterbar.

STEP 5. **Backfill the water bar.**

a. Dig a 12" wide and 6" deep trench along the uphill side of the timber.

b. Fill the trench with crushed stone, leaving a few inches of the timber exposed.

c. At the outlet of the waterbar, place an apron of crushed stone to prevent erosion.

d. Pack soil and gravel up against the downhill side of the timber so that the top of it is flush with the path.

e. Cover all disturbed soil with seed and mulch or cover with leaf litter.

Maintenance

INSPECT: Inspect seasonally and after large storm for signs of erosion or accumulated sediment.

CLEAN: Clean out accumulated sediment, leaves, and debris. The stone may need to be cleaned or replaced periodically if void spaces get filled with sediment. Remove and replace with clean stone or remove clogged stone, wash, and reinstall.

Design Reference

Maine Department of Environmental Protection. *Conservation Practices for Homeowners*. Fact Sheet Series. May 2006.

Figure used with permission from the Maine Department of Environmental Protection.