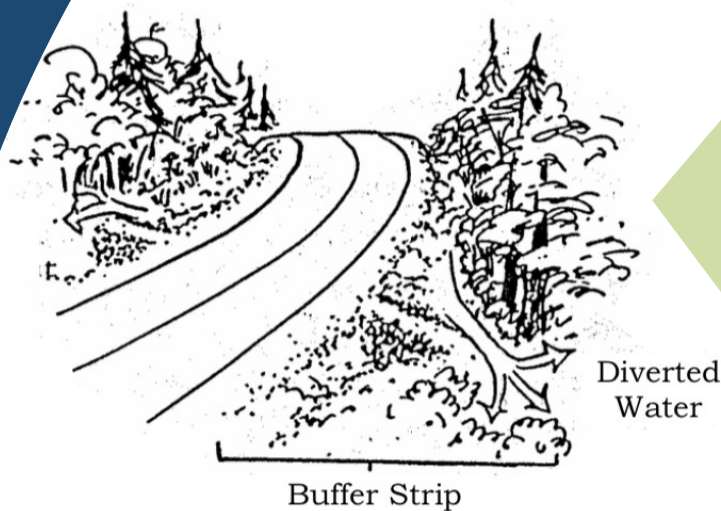


Lake Wise Info Sheet



TURNOUTS & ROCK APRONS

Low impact lake access



Description.

Turnouts and rock aprons receive channelized flow from swales, ditches, and culverts and convert it to sheet flow before entering stable vegetated areas. Turnouts are extensions of ditches that redirect water, slow it down, and disperse it. A rock apron is a shallow basin lined with stones used to settle and filter water from concentrated flows.

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 & BMP under the VTrans Better Roads Program

Related Info Sheets:

- Water Bars & Open-top Culverts
- Driveways & Lake Roads Planning Pathways

Turnouts and rock aprons convey and convert runoff to sheetflow to be absorbed by a vegetated buffer, like a meadow or forest with a healthy duff layer.

Applicability.

Turnouts and rock aprons can be used to slow and filter stormwater runoff from ditches, culverts, and water bars, dissipate flows and settle suspended solids before runoff enters stable vegetated areas or treatment practices. This reduces erosion and helps to keep sediment from entering the lake. Rock aprons can be used in conjunction with turnouts or can be used on their own. Both practices require an assessment of the area to ensure that redirecting stormwater flows will not negatively impact the surrounding area. Make sure there are sufficiently stabilized and densely vegetated areas to receive and treat runoff. Additional stormwater practices may be needed, such as vegetated filter strips or rain gardens.



Turnout stabilized with angular rock .



Small rock apron at culvert outlet.

Acton Wakefield Watersheds Alliance

VERMONT

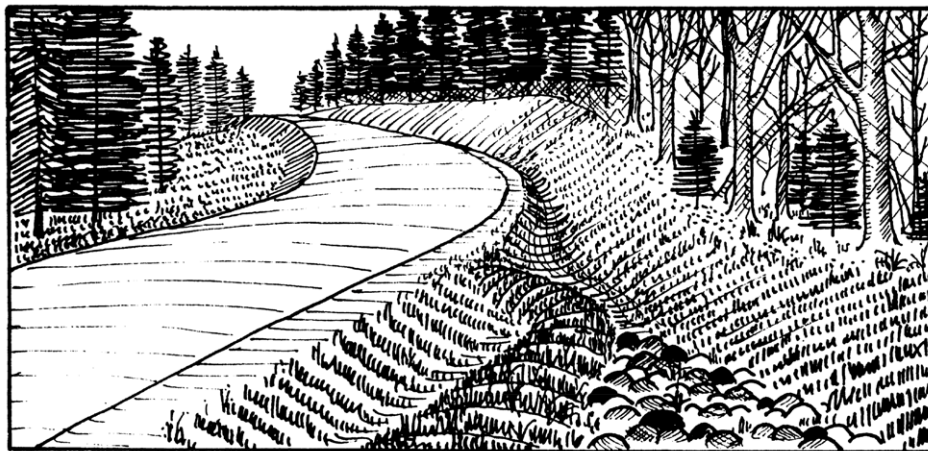
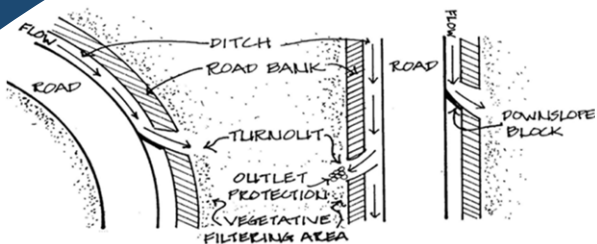
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATERSHED MANAGEMENT DIVISION



Graphics by Greenleaf Design, LLC



Plan view of turnouts placed along a road.



Gravel Road Maintenance Manual

A turnout directs runoff from a ditch into a vegetated buffer area.

VT Better Roads Manual

How to: turnouts.

1. Determine the appropriate location(s) for turnouts, such as a ditch running adjacent to a wooded area and draining to a river or lake. Utilize the natural contours of the land and existing vegetated buffer areas to convey and treat runoff. Do not outlet turnouts to existing stream channels or drainage ways. If applicable, check with abutting property owners before creating a turnout to ensure that the water will not adversely impact their property.
2. Using a shovel, backhoe, excavator, or other equipment, dig a trench that intersects the ditch or swale at the same depth as the bottom of that ditch or swale. Gently slope the trench down and away from the road or driveway. It is easier to disperse and infiltrate smaller volumes of water so turnouts should be constructed as often as possible. Ideally, place turnouts every 50 feet or closer, particularly on steep slopes.
3. Stabilize turnouts to prevent erosion. Turnouts with less than a 5-percent slope can be seeded with a conservation mix and stabilized with erosion control blankets or hay or straw mulch until the seed germinates. On steeper slopes or areas receiving greater flow, line the turnout with 3-to-6-inch angular stone riprap.
4. Create a level flared end section of the turnout lined with 4-to-6-inch angular stone or a rock apron to spread out the flow, infiltrating it or converting it to sheet flow before discharging into a stable vegetated area.
5. Additional native vegetation such as live stakes can be planted below the turnout outlet to further protect the area from erosion.

When built properly, turnouts protect road integrity, lake water quality, and natural hydrology.

Materials.

- ☀ Shovel or small equipment like a backhoe or excavator
- ☀ Native plants: live stakes, plant plugs, seed mix

For turnouts:

- ☀ Conservation seed and erosion control or hay/straw mulch for soil stabilization
- ☀ 3" to 6" angular stone

For rock aprons:

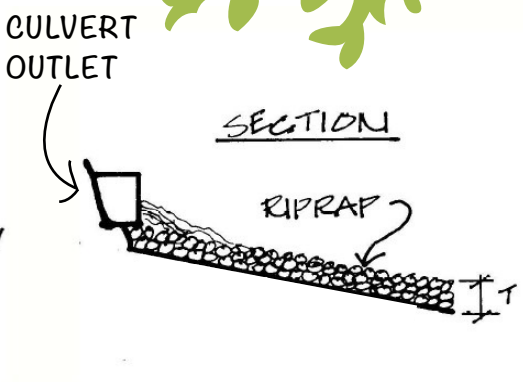
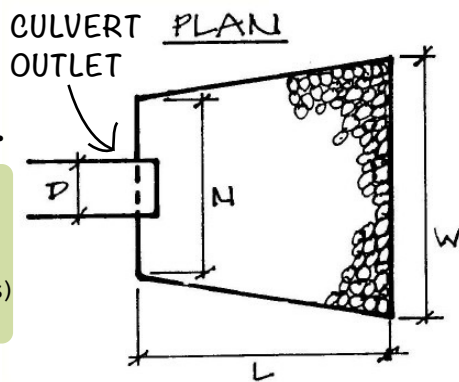
- ☀ Rip-rap - 3" to 12" or larger angular stone, depending on culvert/outlet size and stormwater flows





Rock Apron Dimensions.

D.	L,W.	T.
Culvert/ Outlet Diameter (inches)	Apron Size Length x Width (feet)	Average Rock Size (inches) Depth (inches)
8	3-5 x 2-3	3
12	4-6 x 3-4	5
18	6-8 x 4-6	8
24	8-12 x 6-8	10
30+	12+ x 8+	12+



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

Plan view and section view diagrams of a rock apron receiving water from a culvert outlet, flared at the lower end.

Gravel Road Maintenance Manual

How to: rock aprons.

1. Determine the appropriate location(s) for rock aprons such as the end of a turnout, water bar, gutter extension, or culvert outlet.
2. Excavate a shallow basin around the outlet using a shovel, backhoe, excavator, or other equipment. The size of the basin and stone is reflective of the volume and velocity of water entering the practice, see table below. Construct the basin so that it is narrower by the outlet (where water flows in to the apron) and flared wider away from the outlet. Note that a culvert discharging down a steep slope will require a stone lined conveyance channel down that slope before the water reaches the rock apron. The outlet of the shallow basin shall be level and wide to disperse overflow as sheetflow to vegetated areas.
3. Place riprap in the excavated area, ensuring that no soil is left exposed. Larger stone should be used for areas with higher stormwater volume and velocity.
4. Additional native vegetation such as live stakes can be planted below the rock apron outlet to further protect the area from erosion, especially during large rain events.

Maintenance.

Inspect the practices after large rain events and in the spring. If any damage occurs, repair as soon as possible to stop channelized flow. If it becomes filled up with sediment over time, remove to maintain function. If it is constructed with stone, remove, wash out sediment, and replace with clean stone.

If erosion is occurring downstream of the practice, stabilize the area and replant with native vegetation.

For more information...

- Gravel Road Maintenance Manual: A Guide for Landowners on Camp and Other Gravel Roads (2016)
- Vermont Better Roads Manual (2019)
- Contact your VT DEC Basin Planner, River Management Engineer and/or town office for assistance with design, funding, and permits.

