

Ditch maintenance protects roads

Spring's gushing melt waters can really put roadway drainage systems to the test. Flooding, washouts, and potholes will show you where ditches and culverts are not working. This is the season to identify critical drainage maintenance needs, especially for stretches of road scheduled for surface repair or rehabilitation.

Begin with an inspection. You can use the examples and rating system in the T.I.C.'s *Drainage Manual* (see Resources on page 8). Check ditches for:

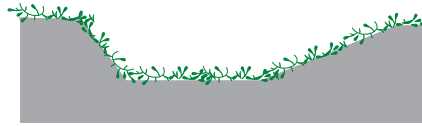
- Obstructions
- Free flowing outlets
- Depth – adequate to drain subgrade
- Width – accommodates flow, minimizes erosion
- Slope – minimal ponding
- Erosion
- Erosion control systems needing repair

Inspect culverts as well. Look for sediment buildup and cracks or corrosion that might lead to failure.

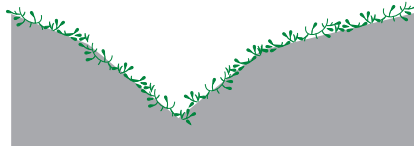
The most efficient ditches have round or flat bottoms. These shapes can be more difficult and expensive to make, but the sides accommodate vegetation better and the shape slows water, reduces erosion, and requires less maintenance. Triangular or V bottom ditches are most easily made and use the least roadside area. However, they require the most maintenance, have the least capacity, and are most susceptible to erosion.



A parabolic or round bottom ditch.



A trapezoidal or flat bottom ditch.



A triangular or V bottom ditch.

The cross or side slope of a ditch should ideally have a drop-to-run ratio of 4:1, that is a drop of 1 foot for every 4 feet of cross section. The maximum slope should be 2½:1. A gentle slope makes mowing and ditch cleaning easier, faster and cheaper. It is also safer for vehicles that may run off the road. A ditch slope of 2½:1 in the clear zone next to a roadway is too steep for safe recovery by errant vehicles.

To keep water out of the road base and subgrade, the ditch bottom should be one foot below the base course. It may have to be deeper if the adjacent right-of-way

and nearby terrain are shedding water into the ditch.

For good flow, the lengthwise slope of the ditch should be 1%—about one foot in every 100 feet. It should not be less than ½%. The maximum longitudinal slope for an unlined ditch is 5%. If a steeper slope is necessary, the ditch should be lined to prevent erosion.

Vegetation in ditches is necessary to help keep the soil in place and minimize erosion. Use rubble, riprap, or fabric to slow water flow on steep slopes. You may also consider installing a short section of storm sewer.

Planning maintenance

Erosion—the source of sediment that clogs ditches—can come from ditch sides and channels, runoff from gravel roads and winter sanding, and material deposited from adjacent land. Vegetation or linings are the most common methods for preventing erosion.

You can stabilize sides and channels with soils, stone, turf, plants, asphalt, or concrete. Turf reinforcement mats can help reinforce natural materials. Choose the materials based on the velocity of flow the ditch must accommodate. The WisDOT Erosion Control Matrix will help you select the appropriate method.

Larger ditch maintenance projects that affect 5 acres or more must be managed according to the erosion control rules in TRANS 401 or NR 151. Small projects that disturb soils must employ erosion control Best Management Practices (BMPs). Emergency maintenance projects are completely exempt.

WisDOT has tested erosion control products and listed those that meet its performance criteria on the WisDOT Product Acceptability List. Projects that fall under TRANS 401 and NR 151 are required to use approved products from that list.

Before you begin ditch maintenance, check to see if the area is in a protected wetland or close to a waterway. Special rules apply to these areas, including restrictions on depositing or side-casting ditch spoils onto the adjacent land. Wetlands are identified on maps available from your local DNR office or county zoning administrator. (See related story on next page.)

Reminder: New erosion rules in effect March 10, 2003

Three new rules take effect March 10, 2003 for new construction sites. They are NR 151 which sets performance standards, NR 216 which covers stormwater discharge permits, and TRANS 201, the DOT's version of NR 151.

TRANS 201 covers any project directed and supervised by DOT. NR 151 covers locally funded projects and some local projects with federal money. Before construction begins, local projects must secure permits through DNR under NR 216, while DOT projects are covered under a blanket permit. Both rules require written erosion control plans and weekly inspections. WisDOT-managed projects also require inspections after a rainfall of a half-inch.

These rules now require construction

sites of one acre or more to control 80% of the sediment load. Previously the size was five or more acres. On transportation projects they also specifically address such concerns as minimizing tracking; proper use and storage of chemicals, cement and other compounds; minimizing sediment discharge from de-watering; sediment clean up; and sewer inlet protection.

Routine ditch cleaning projects "to maintain the original line and grade, hydraulic capacity, or original purpose of the facility" are exempted according to Federal regulation (40 CFR 122.26 (b)(15)(i)).

For more details see the winter 2003 issue of Crossroads and the DNR web page <http://www.dnr.state.wi.us/org/water/flp/waterfront.htm>

Vegetation

Plants and grasses do an excellent job of minimizing erosion, slowing flow velocities, and filtering out pollutants from runoff. Guidelines for vegetation in ditches include:

- Disturb vegetation as little as possible.
- Seed, sod, mulch, and/or place fiber mats immediately. Don't let erosion get started.
- Fertilize, if needed, to speed growth, but do it sparingly. Too much fertilizer can negatively affect the quality of both runoff and infiltration water.
- Mow to control weeds and woody vegetation, but leave vegetation six inches or longer so plants stay healthy and control water velocity and erosion more effectively.

Road rehabilitation and reconstruction are expensive. Don't let poor drainage undermine your investment. Be sure to include drainage improvements as part of roadway upgrade projects and schedule routine repairs every five years.

Parts of this article are adapted from information that originally appeared in the winter 2000 issue of the New Hampshire LTAP center newsletter. The WisDOT Product Acceptability List is on the Web at: <http://www.dot.wisconsin.gov/business/engrserv/pal.htm>.

Details of DNR stormwater rules and descriptive fact sheets are on the Web at: <http://www.dnr.state.wi.us/org/water/wm/nps/admrules.html>.

Copies of the erosion control matrix and the Drainage Manual are available from T.I.C. See page 8.

Ditching regulated in wetlands

Wetlands have special protections because of their environmental benefits. Local road agencies should be familiar with areas where wetlands border their roads before they start ditching operations.

"They should contact the DNR if they suspect they will be working in a wetland area," says Dan Houston, DNR Water Regulation and Zoning Specialist based in Park Falls.

"Ditching wetlands along roadsides is one of the activities we deal with. Maintaining the existing ditch contours is generally not regulated, as long as spoils are not side-cast into the wetland. Mechanized land clearing, grading, or side-casting in wetlands for new or enlarged ditches is regulated."

You can't always tell by looking whether an area is wetland. They are defined by having specific types of wet soils and water-loving plants. However wetland areas are shown on special wetland maps which can be reviewed at the county zoning, Land Conservation Department, or local DNR office.

If it looks like there are wetlands near your planned project or if you find a lot of dark organic matter in the soil, contact the DNR. A trained person can verify the wetlands and assess whether a permit is needed. Permit turnaround can be quite fast



Side-casting ditch spoils into wetlands, as shown in these photos, is regulated by DNR.

during the growing season, Houston says, but they can't make the determination when the ground is frozen or snow-covered.

Furthermore, ditching in a wetland may not help protect your road. "Once you get to the wetland level you're generally at the water table," says Houston. "The best thing to do is leave the wetland soils and wetland vegetation intact. They act as a sponge and a filter to improve the water quality as it runs off."

So, check before you ditch. If you don't, you may face enforcement action.

To obtain copies of wetland maps for your locality contact Lois Simon, DNR, P.O. Box 7921, Madison, WI 53707-7921. lois.simon@dnr.state.wi.us Wetland maps are at a scale of 1" = 2000' or 1:24,000, detailed enough to show where a town road crosses through a wetland.

Details of DNR waterway and wetland rules and descriptive fact sheets are on the Web at: <http://www.dnr.state.wi.us/org/water/fhp/waterfront.htm> for how to contact us.

Silt fence fails in channels

In the last issue of *Crossroads*, this photo appeared with an article on preventing soil erosion, incorrectly implying that it was an appropriate use of silt fence. We were wrong.

"WisDOT does not allow silt fence across a channel, regardless of slope," says Gil Layton Erosion Control Storm Water Specialist, WisDOT District 4. "The reason is that silt fence is not made to be a ditch check. It fails because it can't withstand any heavy load of sediment against it." What you should be using are erosion bales or WisDOT-approved, manufactured temporary ditch checks.

The restriction is included in the new TRANS 401 and DNR 151 erosion control rules which are now in effect.

For a list of approved erosion control products check the WisDOT Product Acceptability List (PAL) on the Web at: <http://www.dot.wisconsin.gov/business/engrserv/pal.htm>

