

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
TECHNICAL STANDARD
DITCH CHECK
1062

DEFINITION

A ditch check is a temporary dam constructed across a swale, drainage ditch, channel, or other area of concentrated flow to reduce the velocity of water. Ditch checks are constructed using stone, straw bales or manufactured products identified on the Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List (PAL).

PURPOSE

The purpose of this practice is to reduce flow velocity and to pond water, thereby reducing active channel erosion and promoting settling of suspended solids behind the ditch check.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies where grading activity occurs in areas of channelized flows and a temporary measure is needed to control erosion and sediment transport until permanent stabilization practices can be applied. For contributing drainage areas less than one acre, ditch checks can be used as construction site sediment control practices. For drainage areas of one acre or more, a sediment trap or basin may be installed for construction site sediment control in accordance with WDNR technical standard Sediment Trap (1063) or Sediment Basin (1064).

Do not place ditch checks in an intermittent or perennial stream under any circumstances without permission from WDNR. Do not use ditch checks as a substitute for major construction site sediment control practices such as sediment basins.

Be aware of applicable federal, state, and local laws, rules, regulations, or permit requirements governing the use and placement of ditch checks. This standard does not contain the text of federal, state, or local laws.

Materials and installation for ditch checks used on WisDOT projects are subject to the requirements of the WisDOT Standard Specifications and the WisDOT Erosion Control PAL/User Guide.

CRITERIA

This section establishes the minimum standards for design, installation and performance requirements.

General Criteria

Design and install all ditch checks to have a minimum height of 10 inches after installation.

Place ditch checks such that the resultant ponding will not adversely impact or damage adjacent areas.

Design and install ditch checks to be capable of withstanding the anticipated flow, volume and velocity.

Use ditch checks during rough grading and remove ditch checks once final grading and stabilization is applied, unless intended as permanent storm water management features.

Do not use either silt fence or single rows of straw bales as ditch checks.

Technical Standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your local WDNR office or the Standards Oversight Council office in Madison, WI at (608) 441-2677.

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Do not use steel posts or rods to stake ditch checks as they are potential safety hazards for ATVs, snowmobiles and bicycles.

Channel Applications

Use the following equation to calculate the spacing of ditch checks in channels:

$$L = H / S$$

Where:

L = distance between ditch checks, in feet

H = height of the ditch check measured from ditch check overflow invert to channel bottom on the downslope side of ditch check, in feet

S = longitudinal slope of the channel in decimal form (e.g., 2% = 2'/100' = 0.02)

Place ditch checks perpendicular to the flow line of the ditch and extend up the slope such that the bottoms of the ends are at least 6 inches higher in elevation than the top of the lowest middle section to assure that runoff will flow through or over the check, or both. If this is not done, flows are forced to the edge of the ditch check causing scour around the sides of the ditch check.

Design ditch checks to fit the channel cross-section to allow for proper installation and prevent washout from occurring. If the ditch check cannot be designed to fit the cross-section of the channel, use a different control measure.

Ditch Check Sediment Traps

It is acceptable to use a ditch check as a construction site sediment control practice when the contributing drainage area to the check is less than one acre.

It is acceptable to use ditch checks at low points in a silt fence line in cases where low points are unavoidable (see Figure 1).

Stone Ditch Checks (See Figure 2)

Design and install stone ditch checks to have a minimum top width of 2 feet measured in the direction of flow with a maximum slope of 2:1 (2 horizontal to 1 vertical) on the upslope and downslope sides.

It is acceptable to use any of the following stone specifications:

- (1) Well-graded angular stone with a D_{50} ¹ of 3 inches or greater with no more than 5% passing the #4 sieve.
- (2) 1-foot layer of 1-inch (#2) washed stone over 3 to 6-inch clear stone.
- (3) Angular stone meeting the gradation for WisDOT specification 312 select crush or local equivalent.

It is acceptable to construct stone ditch checks using bags or socks filled with stone.

Straw Bale Ditch Checks (See Figure 3)

Install straw bale ditch checks using two rows of bales per check with bales on their sides so the twine

¹ The particle size for which 50% of the material by weight is smaller than that size.

wrapped around the bale is off the ground. Stagger the joints between adjacent rows of bales.

Anchor each straw bale using two wooden stakes. Stake the bales tightly against one another. Drive the stakes flush with the top of the bale when soil conditions permit.

Embed or entrench each straw bale 4 inches deep.

Design and install straw bales such that the bottom elevation of the end straw bales are a minimum of 6 inches higher than the top of the lowest middle straw bale.

When installed on bare soils, place channel erosion mat or other non-erodible materials on the downstream side of a straw bale ditch check, and extended a minimum of 6 feet to prevent scour and washing out the toe of the ditch check. WDNR Technical Standard Channel Erosion Mat (1053) contains criteria for the placement of erosion mat in this location.

Manufactured Ditch Checks

For manufactured ditch check products, use those identified on the Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List (PAL).

Manufactured ditch check materials shall be installed in accordance with the manufacturer-supplied methods used in prequalification testing for listing on the WisDOT PAL.

CONSIDERATIONS

- (1) To enhance sediment control, consider using temporary sumps located on the upstream side of a ditch check.
- (2) For added stability, key the base of a stone or rock ditch check into the soil to a depth of 6 inches.
- (3) It is acceptable to underlay stone ditch checks with a nonwoven geotextile fabric to ease ditch check installation and removal.
- (4) Ditch checks installed in grass-lined channels may kill the vegetation if water is ponded for extended periods or excessive siltation occurs. Proper maintenance is required to keep areas above and below the ditch check stabilized.
- (5) The best way to prevent sediment from entering the storm sewer system is to stabilize the disturbed area of the site as quickly as possible, preventing erosion and stopping sediment transport at its source.
- (6) When placing ditch checks in swales adjacent to roadways consider designating a 'clear zone' free of obstacles posing a threat to out of control vehicles.
- (7) Mowing operations may throw stones from ditch checks causing a potential safety hazard.
- (8) Failure of straw bale ditch checks due to improper installation is commonly reported. Consider alternatives to straw bale ditch checks in locations where proper installation will be difficult.
- (9) The various types of ditch checks function in different ways. Some ditch checks act as virtually impermeable dams and others allow flow to pass through. How a ditch check will function should be considered when selecting a type of ditch check that is appropriate for site specific conditions.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

Inspect ditch checks at a minimum weekly and within 24 hours after every precipitation event that produces 0.5 inches of rain or more during a 24-hour period.

Unless incorporated into a permanent storm water management system, remove ditch checks once the final grading and channel stabilization is applied.

Remove sediment deposits when deposits reach half the height of the ditch check. Removal of sediment may require replacement of stone. Complete maintenance as soon as possible with consideration to site conditions.

REFERENCES

WisDOT "Erosion Control Product Acceptability List" is available online at:

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/pal/default.aspx>

Figure 1:
Rock Bags Used for Silt Fence Relief

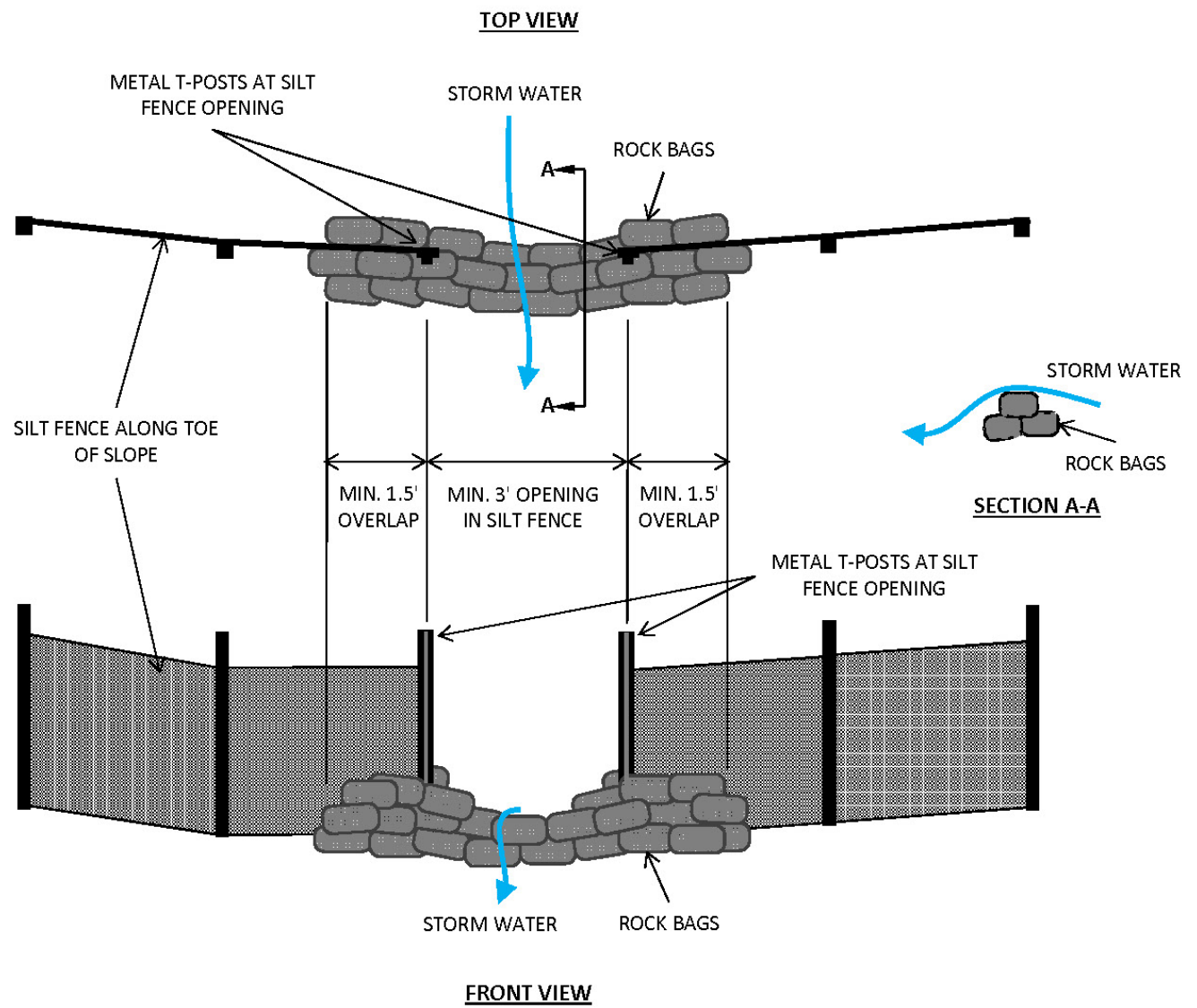
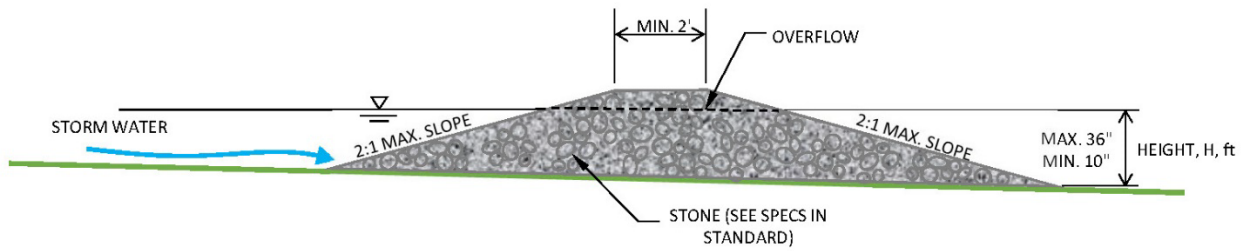
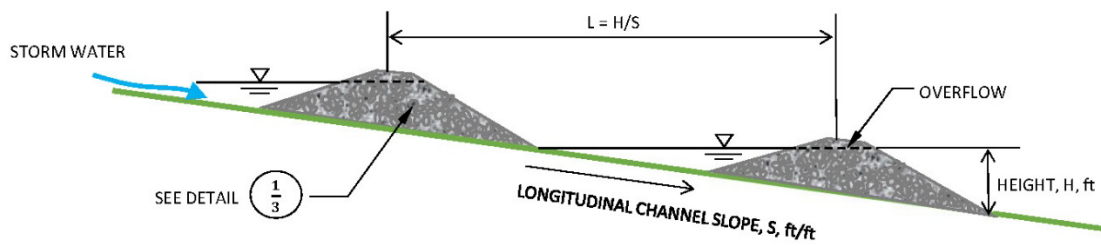


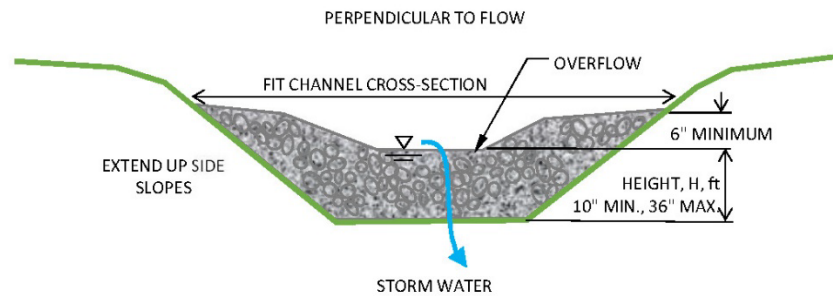
Figure 2:
Stone Ditch Checks



$\frac{1}{3}$ **SECTION AT DITCH CHECK**



$\frac{2}{3}$ **LONGITUDINAL SECTION**



$\frac{3}{3}$ **CROSS SECTION**

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Figure 3:
Straw Bale Ditch Check

