

ENVIRONMENTAL FIELD HANDBOOK
for
VERMONT AGENCY OF TRANSPORTATION
CULVERT & DITCH PROCEDURES



June 2002

DEFINITIONS OF TERMS

The following terms are used in this document:

DTA	District Transportation Administrator
Large Culverts	Culverts having a span greater than ($>$) 48”.
Permanent Erosion Controls	i.e. established vegetation, stone lining, turf reinforcement mats, slope terracing, etc.
Perennial Streams	Watercourses that flow year-round.
Roadside Ditches	Man made swales, which collect and convey runoff away from a transportation facility.
Similar Length	A change in length that is no greater than 10 feet on each end.
Similar Type	Round, Pipe-Arch, Box, Bridge, Open-Bottom Arch.
Small Culverts	Culverts having a span less than or equal to (\leq) 48”.
Surplus Materials	Excess earthen matter generated during maintenance activities.
Temporary Erosion Controls	i.e. seed and mulch, erosion matting, silt fence, etc. See VTrans “T” Standards.
Type I Stone	Stone varying in size from 1” – 12”, with at least 50% 4” or greater.
Type II Stone	Stone varying in size from 2” – 36”, with at least 50% 12” or greater.
VTrans	Vermont Agency of Transportation

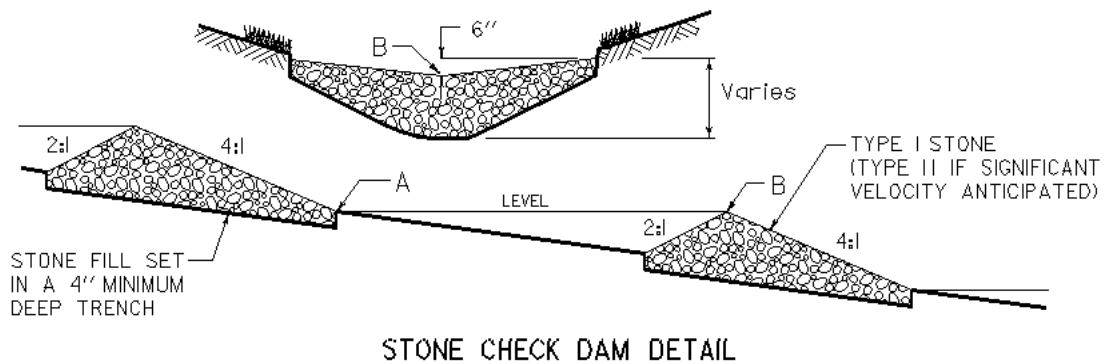
OBJECTIVE

This handbook is intended to assist VTrans maintenance workers in:

- Protecting the natural and cultural resources in the vicinity of transportation facilities.
- Preventing discharge of sediment into waters of the state.

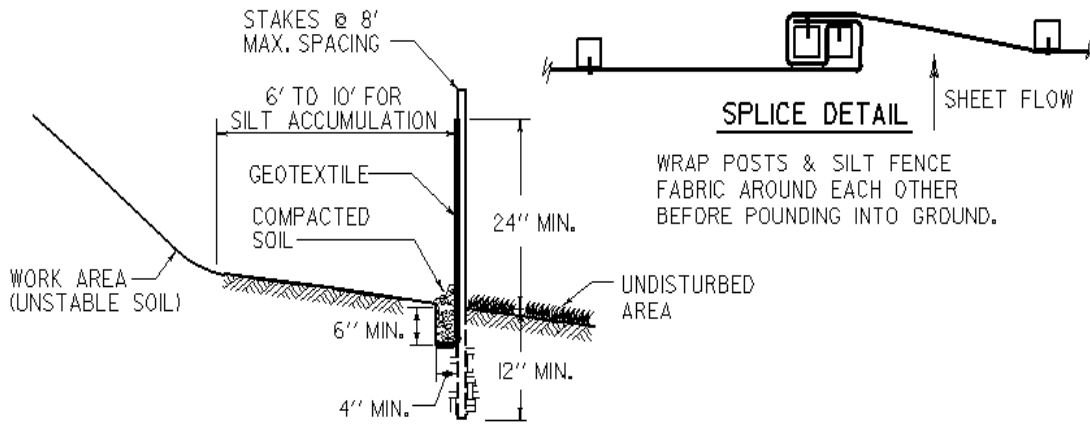
GENERAL GUIDELINES

- Maintenance activities should be performed from the existing road surface, if at all possible.
- All measures shall be taken to minimize the amount of exposed soils during all maintenance activities.
- Surplus materials will not be placed within 100' of any wetland or the top of bank of any river, stream, lake or pond or in an area that has not been approved by the VTrans Biologist and Archaeologist.
- Temporary erosion control measures shall be properly installed before any soil disturbance occurs on a site. They will be inspected and, if necessary, repaired before the end of each workday and maintained until permanent protection measures are established.
- Geotextile shall be placed under all stone fill.
- Seeding should be completed and ditches stabilized before September 15th. If seeding cannot be done before September 15th, non-vegetative protection measures (i.e. erosion matting) must be used on all slopes.
- If projects must, out of necessity, extend beyond October 15th, special winter erosion and sediment control measures (including but not limited to stone check dams and silt fence) will be required. The DTA will make recommendations for winter control measures, which will be approved by the VTrans Environmental Section.



NOTES :

1. CHECK DAMS TO BE USED DURING ESTABLISHMENT OF GRASS LINED DRAINAGE DITCHES
2. LOCATE DOWNSTREAM STRUCTURE SUCH THAT POINT "B" IS APPROXIMATELY LEVEL WITH THE LOWEST GROUND ELEVATION "A" OF THE UPSTREAM STRUCTURE.



SILT FENCE DETAIL

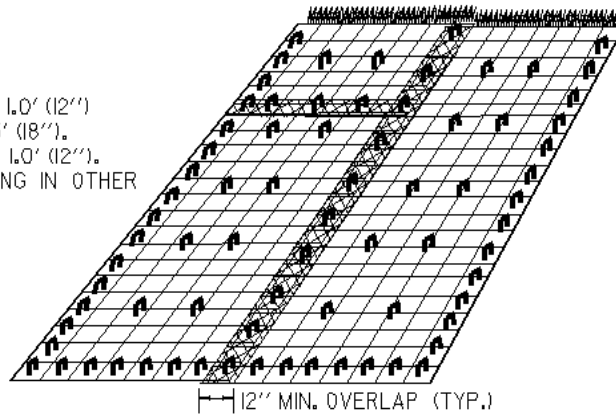
NOTES :

1. DO NOT USE SILT FENCE IN STREAMS, DRAINAGE DITCHES, OR AREAS OF CONCENTRATED FLOW.
2. BACK WITH STAKED-IN-PLACE HAY BALES OR WIRE FENCE IF ADDITIONAL SUPPORT IS NEEDED.
3. SILT FENCE MUST BE REMOVED WHEN WORK AREA IS STABILIZED. SEED AND MULCH SOIL THAT IS DISTURBED DURING REMOVAL.

- For side slopes steeper than 3:1 (H:V), erosion matting should be used.

NOTES :

1. ALL FABRIC OVERLAPS SHALL BE 1.0' (12") MINIMUM WITH STAPLES EVERY 1.5' (18").
2. STAPLE EDGES OF FABRIC EVERY 1.0' (12").
3. USE 3.5' (42") MAX. STAPLE SPACING IN OTHER AREAS.
4. SEE "EROSION MATTING FOR DITCHES" DETAIL FOR ANCHORING AT TOPS OF SLOPES.



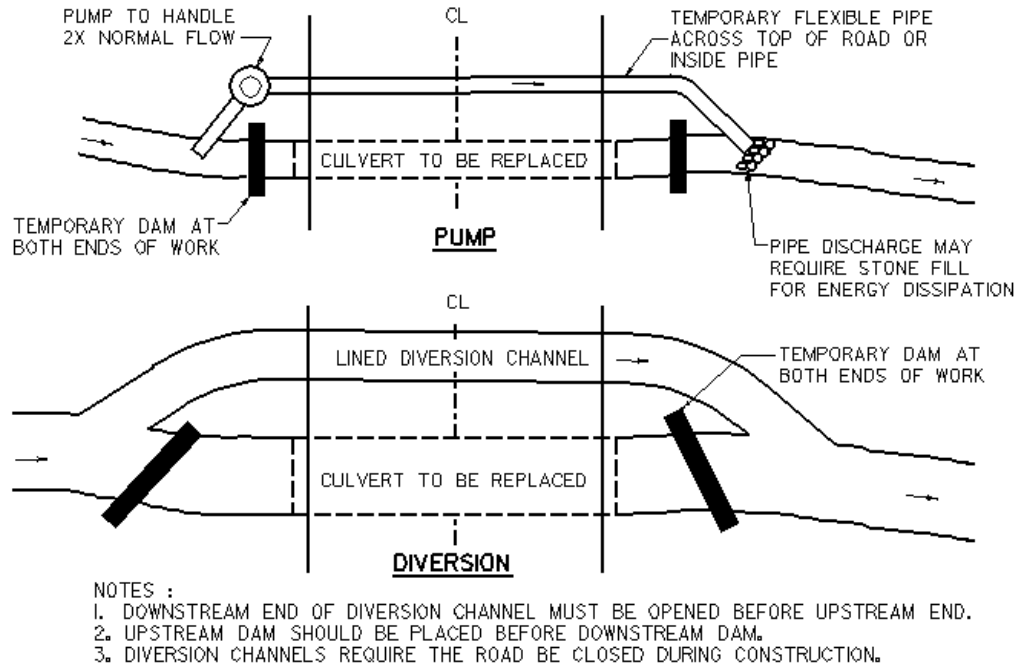
EROSION MATTING FOR SIDE SLOPES STEEPER THAN 3 : 1

CULVERTS

Installing and Replacing Small Culverts (<48")

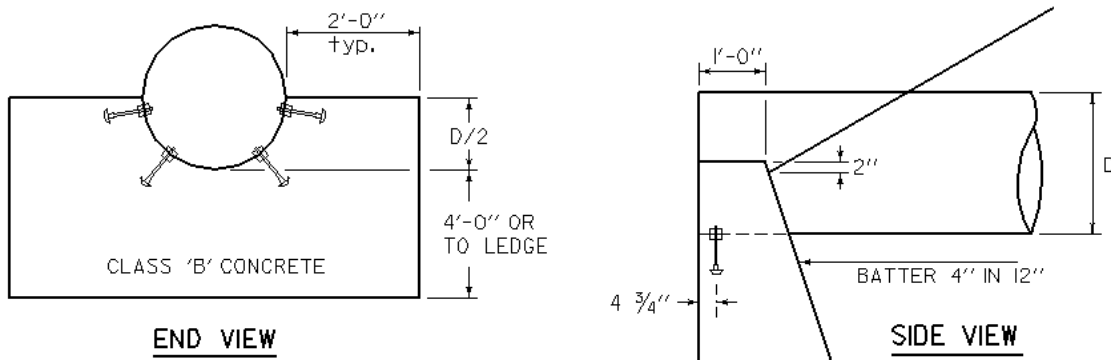
Replacement of culverts that are not of similar length and similar type will require review by the Environmental Section and/or Hydraulics Unit.

- If flows are present, a temporary check dam and bypass system must be used. All downstream flow will be maintained. Pumping may be required.



TEMPORARY BYPASS SYSTEMS

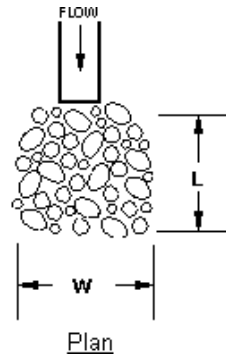
- All construction activities, on culverts carrying perennial streams, must not occur before June 1 or after October 1.
- Headwalls should be considered and constructed where appropriate.



CRADLE HEADWALL DETAILS FOR SMALL CULVERTS

NOTE : REFER TO VTRANS STANDARD DRAWING D-2 FOR ADDITIONAL DETAILS

- If a small-corrugated culvert is to be replaced with a smooth lined culvert; it will require a riprap splash pad for energy dissipation. Unless otherwise specified, the following detail can be used:



Stone Pad Requirements				
Culvert Size	Fill Type	W	L	Thickness
< 24"	Type I Stone	2X Pipe Rise	4X Pipe Span	12"
24" – 48"	Type II Stone	1.5X Pipe Rise	4X Pipe Span	24"

Note: Geotextile must be placed under all stone fill.

Replacing, Repairing, and Lining of Large Culverts (> 48")

- A separate review process is necessary when working with large culverts. VTrans Environmental Section and/or Hydraulics Unit must be contacted.

MAINTENANCE AND CONSTRUCTION OF ROADSIDE DITCHES

Existing Ditch Maintenance and New Ditch Construction

- All temporary erosion control measures will be in place by the close of each construction day.
- If heavy rains wash away seed and mulch, both should be re-applied.
- Temporary erosion control measures will be utilized and inspected, and, if necessary, repaired until final controls are established.
- Permanent erosion control measures will be installed upon completion of the maintenance of each ditch. These measures are dependent on the slope of the ditch as summarized below:

Channel Slope	Ditch Linings	
	Lining	Min. Thickness
0 – 1 %	Seed & Mulch *	4”
1 – 2.5 %	Erosion Control Matting & Seed	--
2.5 – 10 %	Type I (stone)	12”
> 10 %	Type II (stone)	24”
<ul style="list-style-type: none"> • This table is applicable between May 1 and September 15. • Slopes that would require only seeding and mulching between May 1 and September 15 will require seed and erosion matting between September 15 and October 15. • Between October 15 and May 1, all slopes will require winter control measures. 		

* Alternative forms of soil stabilization may be utilized as deemed appropriate by the DTA.



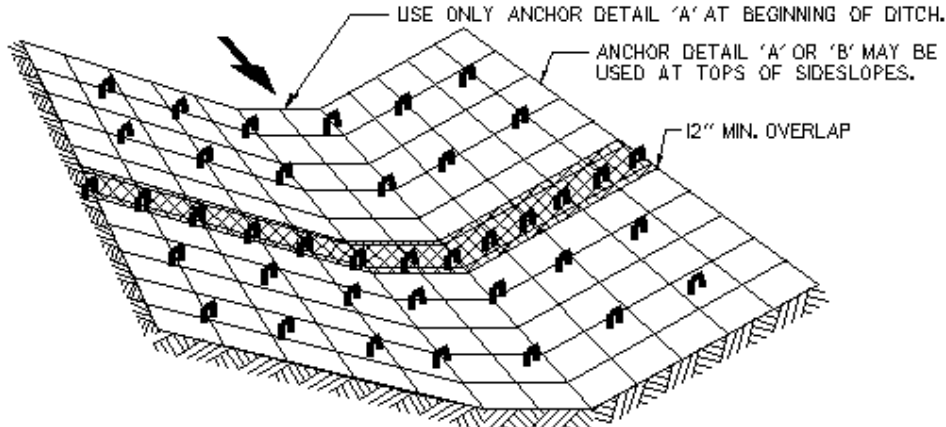
ANCHOR DETAIL 'A'

INSERT & STAPLE FABRIC INTO 0.5' X 0.5' (6" X 6") TRENCH PRIOR TO BACKFILLING & COMPACTING SOIL. USE 3 STAPLE PATTERN EVERY 1.5' (18").



ANCHOR DETAIL 'B'

IF THE TOP OF SLOPE IS RELATIVELY FLAT EXTEND MATERIAL APPROXIMATELY 2.0' (24") AND STAPLE EVERY 1.5' (18") MINIMUM.



EROSION MATTING FOR DITCHES

NOTES:

1. OVERLAPS SHALL BE 1.0' (12") MINIMUM IN THE DIRECTION OF FLOW AND STAPLED EVERY 1.5' (18") MIN. THROUGH BOTH FABRICS.
2. USE 3.5' (42") MAX STAPLE SPACING IN OTHER AREAS.

NOTE

This document is intended to suggest practices for protecting cultural and natural resources during culvert and ditching maintenance activities. It is recognized that controlling erosion is site specific and that variations from the recommendations described in this document will occur. These variations should be accepted by the DTA and cleared by the Environmental Section before implementation.

CONTACTS

John Narowski, P.E.
 VTrans Environmental Services
 Engineer
 Phone: 828-5265
 E-mail: john.narowski@state.vt.us

Mike Tuttle, P.E.
 VTrans Hydraulics Engineer
 Phone: 828-5763
 E-mail: mike.tuttle@state.vt.us